The Modern Army in Action

Maj. Gen. J. F. O'Ryan
and
Capt. W. D. A. Anderson

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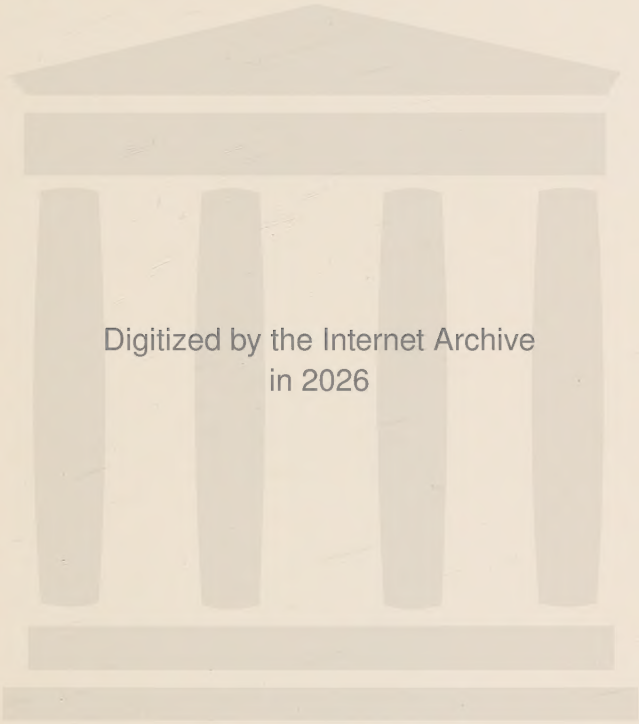
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A portable battery of rapid-fire guns as used by the United States Army in mountainous districts

THE MODERN ARMY IN ACTION

AN EXPOSITION OF THE CONDUCT OF WAR

BY

MAJOR GENERAL JOHN F. O'RYAN

Commanding N. Y. Division

AND

CAPTAIN W. D. A. ANDERSON

Corps of Engineers, U. S. A.

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FOREWORD

I have read "The Modern Army in Action" with very great interest, and consider the subject treated by Major-General O'Ryan and Captain Anderson, especially at this time, as being of prime importance from every point of view. It should, and I have no doubt will, cause the people of our country to devote serious attention to the general technique of war, and direct their thoughts toward the necessity for placing our country in a condition of preparedness which can be secured only through the establishment of adequate reserves for the regular Army and Militia, and ample supplies to equip them in case we have the misfortune to become engaged in war with a first-class power, prepared as these powers are immediately to make their maximum military effort. No matter how righteous our cause may be, or how considerate we may be of the rights of others, we must be prepared to defend our rights and to secure for ourselves just treatment. This cannot be secured by treaties alone. It can

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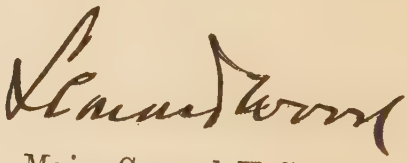
be secured only when our people are prepared promptly to meet force with force. Undeveloped military resources are of no more value in the onset of a modern war than would be an undeveloped gold mine in Alaska during a panic on Wall Street.



Major-General, U. S. A.,
Commanding Eastern Division.

November 4, 1914.

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INTRODUCTION

Since the outbreak of the present war in Europe the interest of the general public in matters military has become keen. Many dissertations on the strategy of the campaigns now in course of conduct have appeared in the daily press. Some of these have obviously been illy considered and hastily prepared, while others were evidently written by men of no military training.

The authors have undertaken the preparation of this elementary treatise on the conduct of war at the request of the publishers, and upon their assurance that there is an intelligent and widespread public demand for a work of this character.

It is believed that this timely book will prove understandable and instructive to the intelligent public, who cannot but realize that much of what is now appearing in the daily press on the conduct of war, ranges from the improbable to the grotesque. The strategy of the present war cannot be written until the facts are authentically

known, and for obvious military reasons these are withheld or distorted by the combatant powers. It is believed, however, that the reader after perusal of this treatise will be enabled more intelligently and with greater interest to follow the reports of the campaigns, to discard theories obviously unreal, and to confine his speculations to what is reasonable and probable under the principles herein laid down. And it should be remembered that many of the principles of strategy are eternal, and even now are the subject of careful consideration by those charged with the conduct of military activities abroad.

The work should prove of interest and value to the large number of officers and men of the National Guard, whose intelligent interest in the profession of arms is so well known, but who have not the time to digest, in addition to their prescribed studies, a detailed and advanced work covering a field so broad as that of strategy.

If the work serves no other purpose than to bring to the minds of some of our influential fellow citizens a realization of the helplessness of a nation forced into war without military preparedness, and the need in this country for an intelligent and provident military policy as a na-

tional insurance, it will have accomplished its mission.

Chapters I, II, III, VIII, IX, X, XI, XII, XIII, XIV, XV, and XVI were written by Major General O'Ryan, and Chapters IV, V, VI and VII by Captain Anderson.

THE MODERN ARMY IN ACTION

THE MODERN ARMY IN ACTION

CHAPTER I

THE GENESIS OF STRATEGY

As accounts are read of the stupendous operations of the armies engaged in the war on the continent of Europe, the thought naturally occurs to the reader how such immense numbers of men are moved, how they are fed, whence they are brought. There is perhaps no field of human activity which has so attracted the attention of men throughout the ages as that of war. In war are seen human emotions at their best and at their worst. The game of war is a magnet which has attracted to destruction more human beings than any agency that has ever existed, and yet out of the fire and bloodshed of war has arisen much that is best in the world to-day. Political freedom, the liberation of slaves, the expansion of

governments, and the development of savage peoples, all these are the products of war.

It is said that the human mind is incapable of appreciating numbers which reach millions. The average reader of war news accepts with incredulity accounts which describe millions of men maneuvering and fighting in a common war. But it must be remembered that from the beginning of time, more minds have been concerned in the development of the art of war than of any other art or science, and it is therefore but reasonable that its development should have reached standards of accomplishment not to be expected of younger and more limited fields of endeavor.

The domain of war is so extensive that its activities are grouped into many fields. In any exposition of the work of armies in action and of the conduct of war, the subject should be similarly subdivided.

As war is conducted pursuant to principles based largely on historical precedents, these principles will first be considered. They constitute what is commonly called Strategy. First, then, as to the genesis of Strategy.

The government of every nation reflects in its policy to a greater or less extent the ideals, com-

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A company of Highlanders in heavy marching order deployed in skirmishing line

mercial ambitions, economic needs and national fears of its people. If the government be an autocratic power, its policies may not reflect the sentiments of the people to the extent that a representative form of government would reflect them, but certain it is that public sentiment in all ages and in all forms of government has been an important factor in the determination of the policies of government. Largely through the agency of politics, the national or governmental policy is determined, and when a national policy brings its parent government into collision with a conflicting policy of another government and a readjustment of these conflicting policies cannot through the agency of politics and diplomacy be mutually arranged, recourse is necessarily had to might for the enforcement of the national will. This conflict between national mights, is called war. In war, politics and diplomacy are succeeded by strategy. Strategy is therefore merely an extension of national politics.

On this point, Clausewitz,[1] a leading authority on war, says: "War should not be included in the domain of the arts and sciences, but rather in the sphere of social life. It is a conflict of vast

[1] Clausewitz on War.

interests, which is solved in blood, and only in this respect does it differ from other contests. A better comparison could be made with commerce than with any art whatever, for trade is also a conflict of human interests and activities; and much nearer to it still is politics, which, for its part, can be regarded as a species of trade on a large scale. Besides, it is the lap in which war is developed; in it the features of war are already obscurely outlined, like the attributes of living creatures in their germs."

Strategy is the art of directing armies so as best to attain the ends for which the war is fought. Strategy deals with questions involving the movements of military forces, the decision to give battle, and the time, place and manner of offering it. Tactics relate to the control on the field of combat, of the organizations which compose the army. A strategic study may indicate for example the desirability of promptly moving forces for the seizure of an important railroad center. The order, however, in which the troops are placed in the column of march, and the manner in which they are deployed for the attack for the accomplishment of that object, are tactical considerations.

Clausewitz said of strategy, that it "Fixes the

point where, the time when, and the numerical forces with which the battle is fought."

Jomini [2] defines strategy to be "The art of planning military operations upon the map."

Wagner [3] defines strategy as "The art of moving an army in the theater of operations, with a view to placing it in such a position, relative to the enemy, as to increase the probability of victory, increase the consequences of victory, or lessen the consequences of defeat."

The conduct of war includes another field of thought and of activity equal in importance to that of strategy. That field relates to the problems involved in the movement and supply of armies. This subject is called logistics. Therefore, we have politics determining the national policy, which makes war and fixes its objects, strategy providing the plan of operations by which the armies are to forcibly gain these objects, logistics solving problems of the movement of the armies to the theater of operations and their maintenance and supply during the period of war, and tactics governing the detailed movement and fighting methods of the organizations composing

[2] "The Art of War"—Jomini.

[3] Wagner's Organization and Tactics.

the army in order to make more effective their offensive or defensive power, under the particular conditions affecting them at the time.

The earliest warlike contests of mankind were doubtless fought out for the possession of particular hunting grounds, or of natural features of the terrain, such as caves, lakes, woods or streams. There is early historical record of raids and wars conducted for punitive purposes, and for the capture of women and slaves. From the earliest times when man's weapons were but stone hatchets, his cunning prompted him to cooperate his efforts in the fight with those of his fellow warriors. Experience and observation showed him the most effective ways of using his crude weapons, and example and emulation produced standards and methods among clans which might, broadly considered, be termed tactics. Strategy, however, was not developed until man's mind had developed its reasoning powers, its analytical sense. As the man born without speech or sight is apt to develop the remaining senses more fully and acutely, so it is probable that clans or tribes physically weaker than their neighbors, were here and there enabled to survive by resorting to strategic movements more effective in their re-

sults than would have been mere physical resistance. This was strategy in its infancy. Surprise was probably one of the earliest manifestations of a knowledge and appreciation of strategy. To accomplish surprise requires a maneuvering of forces, and surprise was probably the first principle of strategy practically applied by ancient man.

The earliest record of warfare comes to us from the Jews. The Bible contains many accounts which give us a general idea of the conduct of war in the earliest times. The records of early wars are also preserved on Egyptian monuments and from these we know something of the armament and organization of the ancients. In Homer's Iliad we see a picture of war as it was conducted more than a thousand years before the birth of Christ. We glean a knowledge of Persian wars and of the strategy in the era before Christianity from the accounts of Herodotus, and from other ancient writers we are able to follow the gradual development of the earlier methods of warfare.

Warfare is generally grouped into four stages of development. First, from the earliest times to the fall of the Roman Empire in the west, A. D. 476. This period includes three of the great cap-

tains of history: Alexander, Hannibal, and Cæsar. The second stage covers the wars of the Middle Ages from the fall of the Roman Empire to the Thirty Years' Wars, A. D. 1618. The third stage covers the modern wars, from 1618 to the beginning of the French Revolution. This period includes the wars of the great captains Gustavus Adolphus and Frederick the Great. The fourth stage covers the period of recent wars, from the French Revolution to the Great European War of 1914. This period includes the great captain, Napoleon. These great captains, as they are called, were the exponents of the strategy of their time.

The subject of international arbitration is not here discussed at length, for the reason that it is not strictly germane to strategy, and also because of its evident futility as a dependable agency for the adjustment of conflicting international policies.

In view, however, of the large number of persons in our country who as advocates of perpetual peace believe in the efficacy of disarmament and of the neglect of military preparedness as means to that most desirable end, passing reference is made to the subject of international arbitration. It is believed that a study of the history of man-

kind and of the world's nations shows little upon which to base a belief that in the matter of self-interest peoples and governments of this age differ greatly from those of the past, and that they will no longer resort to force for the accomplishment of their ends when other means fail.

To the military student, history teaches the lesson that nations will abrogate or disregard the most solemn treaty obligations when the national conscience will justify such act on the ground of necessity. The fact that the national conscience of other nations not confronted with the momentous consequence involved will not justify the act, is immaterial in the determination of the question of war or peace by the nation concerned. This truth is frequently lost sight of. Necessity knows no law, and when a nation on the verge of war, sees its power handicapped and its estate jeopardized by treaty obligations, those obligations are frequently disregarded on the ground of national necessity. As a self-confessed murderer, under our system of jurisprudence, cannot by pleading guilty stipulate away his life, but is required to stand trial, so it might also be said that by the common consent of mankind, a government cannot stipulate away the sovereign life of the State.

Treaties, therefore, entered into in good faith and with every intention of the fulfilment of mutual obligations by the high contracting parties, are often disregarded when one of the parties is confronted with uncontemplated results of such character that their happening would seriously affect the stability or the vital interests of the nation. We have only to recall that under the terms of the treaty to which Germany was a party, the neutrality of Belgium in the event of war was guaranteed. Nevertheless at the outbreak of the present war in Europe, Germany moved her forces through Belgium in her invasion of France and justified the act mainly on the ground of military necessity.

An international court of arbitration is not a dependable agency for the adjustment of international differences, because it has no power for the enforcement of its decrees. The moral obligation to abide by the decision of a court of arbitration cannot be said to be greater than the moral obligation to abide by the terms of a treaty solemnly and voluntarily entered into. As the judgment of a civil court would become worthless without due process to execute it, and the findings of a criminal court an empty form without a sheriff to enforce them, so the mandate of an interna-

tional court without an international sheriff to enforce its decrees, becomes a futile agency for the correction of wrongs and the establishment of rights when the judgment-debtor will not voluntarily assume the rôle of sheriff and self-execute the mandate of the court. When, recognizing this organic defect of arbitration as a system for the adjustment of all international differences, we advocate the maintenance of an international force to execute the mandates of the court, we find ourselves seeking to reestablish the very principle of the necessity for armed force, to abolish which was largely the *raison d'être* of arbitration. It must be obvious that the existence of an international force for the execution of international decrees would place a premium on the machinations of governments for the secret control of such force, and with our knowledge of human ambitions and of the influence of self-interest, it must be apparent that the same motives and assumed justification which have in the past caused the commission of national acts of perfidy, will operate to seek perfidious control of a dominant police force maintained at the expense of contributing nations. Thus we might find the innocent and credulous people of a righteous nation which had been lulled into dis-

armament and military unpreparedness through reliance upon the integrity of an international court and the neutrality of the international sheriff, unable to obtain practical justice, their rights flouted in a maze of international legal technicalities and yet helpless through lack of power to protect and enforce their rights. Where international wrongs exist and have existed, they are and always were the wrongs instigated and perpetrated by some one or a number of individual human beings. In the earliest ages they were committed ruthlessly and without a cloak of formal plausibility; in later times, mankind possessing the veneer of civilization, in turn veneered the same ruthless acts with a cloak of sophistry and blessed them with a text. But always there have been ruthless acts, and always there will be, while man continues to be a self-perpetuating and prolific animal. While the color and extent of the veneer may change with the times, future histories will record the continuation of the life-long struggle for existence and the immutability of the law of force in its broadest sense—of the principle of the survival of the fittest among nations. As that which is called civilization advances, man's relations with man become more

complicated and the subjects of greater refinement. This applies to the enginery of war as well as to the machinery of peace, but underneath all the refinements of business, social and governmental customs, below the idealistic atmosphere of literature, art and music, we find plain man, and we see him as he has been throughout the ages so far as self-interest is concerned. That is to say a very small percentage of him will be chivalrous and self-sacrificing in all things and without limitation, but the rest of him is governed by self-interest in the really important affairs of life —in the struggle for existence. When his real interests are assailed he will fight, and frequently he will be the assailant in encroaching upon the rights of others. Mankind of to-day is more prolific with excuses for his acts, more cunning in his sophistry in extenuation of them, and more prone to buttress them with lofty platitudes and solemn declarations, but stripped of these diplomatic habiliments, the acts themselves are recognized as the old friends of history. Therefore it is that the government which is to develop its national resources, aggressively to extend the activities of its people—which, in other words is to survive among the fittest—that government must be and

usually is prepared with the possession of force to accomplish its policies. This throws a similar burden on those nations that fear the aggressions of powerful neighbors and hence the contest for military superiority. Ethically, wrong; but practically in the end suicidal for the nations which cannot keep the pace.

The desire for peace and the avoidance of war so strong in the breast of every right-thinking man, has obscured in many cases, their ability to discern the truth of the foregoing. Throughout the years preceding the present war in Europe military writers and students of military history and of psychology, have again and again pointed out the coming of the inevitable conflict and the desirability of governments preparing in time of peace to protect their interests and integrity when the conflict should come. But in some countries such admonitions are not heeded, and up to the very day of the commencement of the present war a vast number of people otherwise intelligent believed that the sentiment for peace would make war impossible. An example of this timely warning is furnished in the writings of Colonel F. N. Maude of the British Army, who wrote the introduction to the English translation of Clausewitz

on "War." In that introduction, referring to the military spirit on the continent of Europe, he said:

"I do not wish for one moment to be understood as asserting that Clausewitz has been conscientiously studied and understood in any Army, not even in the Prussian, but his work has been the ultimate foundation on which every drill regulation in Europe, except our own, has been reared. It is this ceaseless repetition of his fundamental ideas to which one-half of the male population of every Continental Nation has been subjected for two to three years of their lives, which has tuned their minds to vibrate in harmony with his precepts, and those who know and appreciate this fact at its true value have only to strike the necessary chords in order to evoke a response sufficient to overpower any other ethical conception which those who have not organized their forces beforehand can appeal to."

How truly prophetic is the following from Colonel Maude's introduction referred to:

"In 1887 Germany was on the very verge of War with France and Russia. At that moment her superior efficiency, the consequence of this inborn sense of duty—surely one of the highest qualities of humanity—was so great that it is more than probable that less than six weeks would have sufficed to bring the French to their knees. Indeed, after the first fortnight it would have been possible to begin transferring troops from the Rhine to the Niemen; and the same case may arise again. But if France and Russia had been allowed even ten days' warning the German plan would have been completely defeated. France alone might then have claimed all the efforts that Germany could have put forth to defeat her.

"Yet there are politicians in England so grossly ignorant of the German reading of the Napoleonic lessons that they expect that Nation to sacrifice the enormous advantage they have prepared by a whole century of self-sacrifice and practical patriotism, by an appeal to a Court of Arbitration and the further delays which must arise by going through the medieval formalities of recalling Ambassadors and exchanging ultimatums."

The foregoing positively expressed view of Colonel Maude was borne out when the present European conflict began. And no matter who may be the victor in that conflict, and no matter what the results to other nations may be, it can safely be predicted that the struggle among nations for existence will continue, and that periodically the struggle will find expression in war. There are numerous actors now rehearsing to perform their parts in the coming dramas of the world's future development. They will enter the stage perhaps thoroughly schooled for the performance of their parts, and where these conflict with the lines of other and perhaps wearied actors, the dropping of the curtain will have seen the elimination of the latter from the dramatis personæ of the world's nations.

Strategy therefore is not a waning art. Just

as to-day its sway is dominating the destinies of Europe while at the same time its details embrace all the complicated activities of man and its application transcends in scope and difficulty anything in previous history, so to-morrow with the further advance of civilization, strategy will be confronted with a wider scope, presented with greater and more numerous difficulties and harassed with more momentous consequences. The military student does not justify human weakness nor the evils which flow from them. He does not justify the use of military power for the accomplishment of improper and selfish national ends. He does not glorify the accomplishments of strategy when its light is shed in the support of an unrighteous cause. But he appreciates the influence of strategy on the conduct of war whether the same be conducted for the perpetration of wrongs or for the defense of the right. He knows that the era of warfare has not passed, and that it behooves the government charged with the destinies of a people to be prepared in time of peace for the test of war which may be forced upon them. "The Gods of War are on the side with the heaviest battalions." And it should be

remembered that this means the heaviest battalions at the crucial point of contact. The art of having the heaviest battalions at the right place at the right time—that is Strategy.

CHAPTER II

ON WAR

War is a contest between nations in which each seeks to impose its will on the other through the agency of physical force and violence. In the utilization of physical force, each side avails itself of the inventions of science and of art in order to make its violence more effective. There are no restrictions, except those customs and usages which have come to be recognized with the advance of civilization and which find their expression in the rules of warfare laid down and agreed upon in international conventions.

As war involves the utilization of violence to its limit, it follows that war necessitates the destruction of lives and of property on a large scale. This loss is inseparable from the conduct of war. Clausewitz [1] says:

"Now, philanthropists may easily imagine there is a skilful method of disarming and overcoming an enemy without causing great bloodshed, and that this is the proper tendency of

[1] Clausewitz "On War."

the art of war. However plausible this may appear, still it is an error which must be extirpated; for in such dangerous things as war, the errors which proceed from a spirit of benevolence are the worst. As the use of physical force to the utmost extent by no means excludes the cooperation of intelligence, it follows that he who uses force unsparingly, without reference to the bloodshed involved, must obtain a superiority if his adversary uses less vigor in its application. The former then dictates the law to the latter, and both proceed to extremities to which the only limitations are those imposed by the amount of counteracting forces on each side. This is the way in which the matter must be viewed; and it is to no purpose, it is even against one's own interest, to turn away from the consideration of the real nature of the affair, because the horror of its elements excites repugnance."

Civilization nevertheless has succeeded by the introduction of rules of warfare in ameliorating many of the cruelties of war which existed in the past. Particularly does this apply to the protection now afforded noncombatants and prisoners of war and the care given to the wounded, not only of one side but to those of the enemy falling into the hands of the opponent.

War results from many causes. When these, however, are classified, it will be found that they closely resemble the causes which actuate individual men to deal violently with each other. The causes of war may be grouped generally into two

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Strongly entrenched and screened Belgian infantry guarding an important railroad line

classes; those based on hatred and those based on assumed necessity. The former group includes racial and religious animosities and the latter colonial expansion and trade supremacy.

All the activities of war are based on the necessity of disarming the enemy, or rendering him unable to offer further resistance, in order to make him incapable of opposing the will of the victor. This means that the defeated nation must be placed in a position, the continuance of which is more disadvantageous to him than would be the acceptance of the terms demanded as a condition of peace. The more forcibly the enemy is pushed into such a situation and the more disadvantageous that situation is made for him, the quicker will he yield—the sooner will there be peace. In a fight between individuals both of whom are armed, that one who is first disarmed will be the first forced to yield. It is the same with nations. The object of military operations viewed broadly, is therefore, to disarm the enemy, either actually, or by placing him in a position where disarmament appears inevitable. In this connection it should be remembered that a defeated army unless thoroughly crushed or disarmed may, even if seriously defeated, be resup-

plied and reequipped and return to fight again. The object of war therefore is to completely disarm and crush the opponent's forces, or to place him in such position and condition that the probability of such result will force terms of peace satisfactory to the victor.

History shows that nations defeated in war have sometimes regarded the defeat merely as a temporary embarrassment, although acceding to all the demands of the victor. In such cases, the theory of acceptance and of submission was to live for a day of reckoning.

The conduct of war is an art and not an exact science and among the factors which enter into the problem of success there will be found that one which has been designated "the fortune of war." For it is true that success is frequently lost or gained as the case may be, by the intervention of unforeseen circumstances. On this point Clausewitz says that from the outset of war "There is a play of possibilities, probabilities, good and bad luck, which spreads about with all the coarse and fine threads of its web, and makes war, of all branches of human activity, the most like a gambling game."

In war the might and power of the nation is

represented by its military and naval forces and so essential is it for the success of the war that these agencies attain the highest efficiency that the activities of the people are subordinated to that end. The soldier is conscripted, clothed, armed, fed, supplied and transported at the expense of all, in order that he may fight with the greatest efficiency and with the greatest numbers at the right time and place.

Until the present century wars were frequently of long duration and included long periods of military inactivity. Warfare of the present generation, however, is conducted on so gigantic a scale that the expense involved demands a continuous performance looking for the early attainment of the objective. This policy reaches its highest fulfilment on the continent of Europe where the national armies are constituted of the nation in arms and where every preparation is made in time of peace for making of the nation in arms an efficient army in time of war. The exception to the present-day policy is found in countries like the United States which relies not on preparedness for war but on its vast population and its mighty resources. A long period of time would be necessary for the United States, out of these resources,

vast as they are, to manufacture a modern army commensurate with its needs in any great war.

We cannot refer to the conduct of war without reference to the subject of leadership. An army requires a general. While it is true that the more martial nations are those whose territory is mountainous and whose people live simply, these conditions do not necessarily increase the genius of the people for the development of high command. The conditions referred to make for prevalence among the people, of courage, initiative and physical fitness, but not necessarily the development of a high character of generalship. That depends in a great measure upon the standard of intellectual development in the country. Among uncivilized tribes will frequently be found a warlike spirit, higher than that possessed by the people of civilized nations. But a high order of leadership is seldom found among uncivilized tribes, certainly not of a standard which could be called generalship. Generalship requires a high development of the reasoning powers as well as natural aptitude, physical fitness and courage, and it will be found that the greatest generals have been produced by the nations whose people combine these qualities in the highest degree.

This is exemplified by the military records of Rome, France, Germany, Great Britain, and the United States. A military leader requires not only intellectual development of a high order but great physical and moral courage. By physical courage is not necessarily meant contempt for danger or the physical inability to experience fear, but more the power to dominate the weaknesses of the body. It is told of one of Napoleon's marshals that during a battle, while giving instructions to a young officer, he was chagrined to observe that his own hands and knees were trembling and that the young officer observed it. He relieved the situation by turning from the young man and addressing his body as follows: "Yes, you're trembling now, but how you would shake if you but knew where I intend to take you in a few moments." This was surely the supremacy of the will over the frailties of the body.

In any consideration of war, the moral forces which enter into its conduct should be recognized. Traced to its source, a battle is in a way merely an expression of hostility, and hostility is a feeling. The individual feelings of hostility possessed by the men constituting an army form the national hatred so often manifested in war.

These feelings of the individual men are merged with other feelings such as courage, fear, ambition, love of power, and lust of battle. These feelings, their causes and effects, and the methods for stimulating those that are valuable in war and suppressing those that are detrimental, constitute the psychology of warfare. One of the most important departments of the psychology of war is the psychology of discipline, for discipline is that indefinable psychic something which, when present in the individual or in an organization of individuals, makes possible control and concerted action and a degree of accomplishment not otherwise attainable.

One of the most serious obstacles to be overcome by armies in action is the instinct of self-preservation. Any conditions which jeopardize the life of the normal man produces among other emotions the emotion of fear; and of all human emotions the most potent is ordinarily, fear. But fear is incompatible with the duties to be performed by the soldier, because fear is an active and demoralizing emotion. It is communicable and contagious. It may produce panic and stampede other forces who know not the cause for the fear of those first stricken. Great fear might

be termed a psychological cholera, for its effects are deadly and it thrives among the ignorant.

In the preparation for war every psychological artifice is availed of in the effort to suppress the inborn instinct of fear, and generally to control and discipline the human emotions. Largely this is done through the agency of drill for the purpose of establishing habit. The aim of constant drill is not to produce perfection, but to create habit; to bring about in other words, by constant repetition, a physical response to the stimulus of command that is so automatic as not to involve a conscious mental operation.

When the instinct of fear seizes possession of the human heart, the man's reasoning powers largely vanish. Fear is in possession of the muscles and of the nerves, and the man acts sub-consciously—with animal instinct. To attempt the control of such a man or a combination of such men by an appeal to reason would be futile. To combat fear under such circumstances, fire must be fought with fire. Resort is therefore had to the use of stimuli that will act as fear acts, viz., automatically. These stimuli are the military commands which through reiteration and long established habit are responded to. An interesting

incident illustrating this occurred in the Santiago campaign in the Spanish-American war. The American forces were forming for the attack when one of the companies sustained a number of casualties. It was the first engagement for most of the men of the company. Some confusion in the ranks was shortly followed by evidence of panic, when the company commander had the company arise, and gave in succession the commands, "Present arms," "right shoulder arms," "order arms," "lie down." The automatic responses, the result of long training and drill followed, and something else also followed. The machine like precision of *all* the men gave to *each* man an optical demonstration, automatically recorded, that discipline and organization still prevailed. Panic was averted; confidence was restored. Yet how difficult for the man having no knowledge of the psychology of war to conceive an officer conducting a drill of precision at such a time and under such circumstances even for a few moments.

The more the details of military action in battle are handed over to the effortless custody of automatism, the more are the higher powers of mind set free for their own proper work. Habit enters largely into the daily life of every

man. It is common knowledge that after wearing a soft hat for a considerable period of time, the wearer who substitutes a derby will find himself in his first attempt to raise the hat from his head, bringing his hand to the crown rather than to the brim for that purpose. This is the result of habit. Who can say that he never unconsciously wound his watch as a result of removing his waistcoat in the day time? From force of habit the removal of the garment was the automatic signal for the winding of the watch, and the necessary movements followed. Who can say what shoe he first puts on in the morning, or which arm he first inserts in the coat sleeve? These questions cannot ordinarily be answered because this work is done for us automatically by our brain nerve servants, and these nerve servants always perform this work in the same manner. For some of us to answer these questions, it would be necessary to actually put on the shoes and coat and observe the order in which these servants performed their work. What a commentary on the force of habit in human existence!

The Duke of Wellington once exclaimed, "Habit a second nature!—habit is ten times nature." And so we find that riderless cavalry

horses on many battlefields have joined in column of fours and have been controlled by trumpet calls —habit. Convicts grown old in prison after a short period of freedom have asked to be returned to prison in order to regain the environment and customs which through habit had entered into and dominated their existence. Habit, therefore, psychologically understood, is regarded as a most valuable ally in the control of men, particularly when they are experiencing the emotion of fear. And it is the establishment of habit which is largely the object of constant drill.

The stimulating effect of martial music on soldiers has been recognized for ages. Frequently the Colonel of a regiment whose men are jaded on the march will direct the bandmaster to "play up" the pluck of the men. The effect is instantaneous, and yet it is evident that the sound waves of the music produce no change in the muscular state. It is entirely psychological. The muscles of the men are as fatigued, but the men no longer believe they are fatigued and in consequence the burdens of the march are lightened.

The influence of psychology on armies in action has been recognized for many years. Little, how-

ever, has been written on the subject until recently.

In the conduct of war there are four factors to be considered; numbers, armament, technical training and morale. Napoleon is authority for the statement that three-fourths of the credit for victory belong to the last factor—to morale. It was one of Napoleon's marshals, Marmont, who in an essay on the spirit of military institutions, remarked:

"100,000 men far away from families, property, interests; the exhibition of their docility, obedience, mobility and state of preservation; finally the existence of a spirit which animates them in such manner as to lead them to throw themselves with pleasure into the most imminent dangers in which many of them will find death itself, at the mere signal of a single man—this assuredly is one of the most extraordinary spectacles which can be presented in the society of mankind; it is a phenomenon the cause and principle of which are only to be found among the mysteries of the human heart."

We might sum this up and say that morale is the soul—the military spirit of an army. In the conduct of war much depends on the morale of the army.

CHAPTER III

PREPARATIONS FOR WAR

In the earliest times every male from the age when he could use a weapon until his age rendered him helpless, was a warrior. As his intelligence increased and he developed arts and sciences their products were applied for warlike use as well as for peace time demands. Gradually the warriors accustomed to fight in masses without particular order, were exercised and trained in preparation for war. This was done under the leadership of the more expert and intelligent. Tribes learned to build their huts and villages in places difficult of access and learned to protect them with walls and stockades. From these rude beginnings developed the fortified towns of later days. As tribes expanded into nations, warfare became more complicated and a greater undertaking. There were two factors which gradually resulted in the development of standing armies among the ancients. These were the existence of caste and the necessity for a part of the people to devote

their energies to productive fields in order to provide means and subsistence for the conduct of war. The Phœnicians were the first to employ a standing army. They maintained a paid force and this system enabled the states to carry on the commerce, upon which their resources and power largely depended. Standing or mercenary armies were also employed by Egypt and Persia, and in time of need they were augmented by drafting warriors from entire sections of the countries. Generally it may be said, however, that warfare was not conducted on an efficient scale among the Oriental nations. What their armies lacked in efficiency and preparedness the Orientals sought to make up by the magnitude of their forces, and history tells us of the vast territories overrun by them. The flower of the Oriental army was the cavalry. This was due to the excellent mounts then available among the Eastern peoples. Their superiority in cavalry endured long after Greece had demonstrated the superiority of the Grecian infantry.

In Greece every citizen was a soldier and he was trained as such. Religion, education, and public athletic contests contributed to the preparation of the Greek citizen for war. He was a soldier

between the ages of eighteen and sixty and political preferment was based upon military distinction. The Greek armies were mobile, although they lacked cavalry. After the Trojan War chariots disappeared. The men were not paid but were allowed to loot. The discipline of the Spartan soldier is proverbial. The habits of the Spartan people were simple and they developed, what for that time, was perfect infantry. In the periods of peace, the training of the soldier for war was incessant. This training, however, was largely a training of the body and the Spartans knew little of strategy. The Athenian citizen was equally amenable for the military service, but his military life was divided into two periods. From eighteen to forty he was available for any service, while from forty to sixty his service was limited to resisting invasion.

After the development of the Persian Empire under the great Cyrus many of the Persian satraps, acquiring power and ease, lost interest in the rigorous requirements of war preparation and lived in their harems. Mercenary troops were largely employed. Tactics and war preparation lapsed. In Greece also, mercenary troops began to be employed and although citizens were still

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A German firing-line illustrating density of position to obtain fire superiority

held to serve the State as soldiers, substitutes were allowed, and troops were paid.

Under Philip of Macedon and his son Alexander the Great, the Macedonian Phalanx obtained its wonderful reputation for shock and action. Under these men the army was thoroughly prepared in time of peace, discipline was rigid, and the cavalry was trained to a high degree of discipline and drill. The army was trained to endure long marches and severe hardships. The Field Artillery of that day, consisting of ballistas and catapults, were developed to a high degree of efficiency. Alexander organized a corps of young men of the best families who lived near the king's person and learned the profession of arms in the field. Generally it may be said that in his preparation for his historic invasion of Persia, Alexander developed every department of military activity.

In like manner it will be found throughout the history of the world that where success has come to armies and their leaders, it can be attributed in large measure not only to the genius possessed by the leader, but to thorough and detailed preparation in time of peace for the trials and exactions of a state of war. Hannibal, Cæsar, Gustavus

Adolphus, Napoleon, Von Moltke, and the forces successfully handled by them, all illustrate the correctness of this principle.

Preparation for war includes not only the physical training of the combatant forces, but the obtaining in time of peace of military information concerning the enemy. This information covers the geography, resources and military strength of the opponent, the character and composition of his forces, their clothing, arms and equipment. It also includes the preparation of military maps of possible theaters of operations, and in recent years the playing of war games on such maps under assumed conditions approximating as closely as possible the conditions that would obtain in war. Information of the enemy's country is obtained in time of peace not only from available books and commercial sources of information, but through local representatives of the government, such as consuls and military attachés. In addition to these, most governments possess an efficient secret service to obtain special information. The chapter on Mobility and Concentration illustrates the vast field of preparation necessarily covered in time of peace to produce

promptly at the outbreak of war, the forces described therein.

War is a greedy destroyer, and in active operations the expenditure of ammunition and the destruction of military property and equipment are so great that almost from the declaration of war, a steady stream to cover this expenditure and waste should commence to flow from the home depots to the armies at the front. To insure this, the nation conducting war should possess not only the resources in raw material necessary for the manufacture of such articles, but, in addition, the manufacturing plants capable of producing promptly in an amount sufficient to meet the demands, the supplies required. The greatest difficulty in the manufacture of such supplies relates to ammunition, for the use of ammunition in time of war so far exceeds its use in time of peace, that it is not profitable for a commercial plant to maintain in time of peace a plant equal to the demands of war. Hence, in most countries the commercial plants are supplemented by government-owned factories so constructed and equipped that they are capable of almost immediate expansion on a big scale.

Most governments maintain in time of peace large supply depots where are stored the arms, clothing and equipment for such number of men as the country under its system of raising armies can make available promptly at the outbreak of hostilities. In the great military nations on the continent of Europe this armament and equipment are not stored in centralized supply depots, but are decentralized to such an extent that every member of the first line of reserves at least has practically in his possession the arms and clothing necessary for him to possess at the call to the colors. This property is stored in local barracks or depots in every town, and each individual reservist knows where and how to draw this property when the demand for his services is made.

In the preparation of the forces of a nation for war, numbers and armament are not the only essentials. The result of the battle of Bull Run in 1861 forcibly illustrates this. Technical training is also a part, and an important part, of the preparation for war. The various systems in use for providing this training are explained in some of the succeeding chapters, but here it may be said in general that clothing a citizen in a soldier's uniform and providing him with arms, does not

necessarily make of him a soldier. Yet there exists in this country among some of our people, a belief that national policies may be forcibly sustained when necessary, by the action of a million men springing to arms at their country's call. With a little reflection, however, it must be apparent, even assuming the ability of the government to promptly clothe and equip, supply and maintain such a force, that they would not constitute an army in the proper sense of the term. No one has been able to suggest from what source the officers for such a force or even for fifty per cent. of that force, could be obtained. The effort to obtain the necessary non-commissioned officers for their elementary training would seem to be equally hopeless. In truth they would have to be created, and the creation of an efficient military officer is a slow process. There is almost a fixed ratio of efficiency between the soldiers of an organization and the officers who command them. If the officers are inefficient, the men reflect their inefficiency.

Is it to be believed that an aggregation of individuals hastily organized into military units and later grouped into large commands can seriously be regarded as an army? Such a force

would lack confidence in its own ability, and we have seen that this confidence is in itself an essential in the make-up of an army. By confidence is not meant ignorant enthusiasm, but military morale, the importance of which has already been referred to.

Therefore it is that in the preparation for war, not only do governments accumulate material things necessary for the conduct of the war, but they provide in some manner for the technical training and the development of the military morale of those who are to do the fighting.

Success in war depends, however, not only on what may properly be included in the preparation for its advent, but fundamentally it depends on the extent to which the people possess those manly qualities which enable men to suffer and endure without loss of courage and the determination to conquer. History shows that nations that have possessed these qualities have subsequently parted with them through generations of easy living and sensual ease. The development of morale requires the presence of a spirit of individual self-sacrifice. An old saying has it, "Common suffering unites more than common joys." We have only to remember the fall of

the Roman Empire to realize that in the conduct of war and in the preparation for war, something more is necessary than a high standard of education and the possession of a civilization which provides the material things for war and the good things for life. "He that has a crust has a creed." And it will be found that the people who combine with education, the simple and correct life, are more apt to possess the spirit of self-sacrifice and the ability to suffer and endure than a people who give themselves up to the comforts and enjoyments provided by civilization.

CHAPTER IV

GERMAN SYSTEM OF TRAINING

The strength of the German government rests on its military system which is based on a full realization of the principle of national service. History shows that while progress in civilization develops in peace, progress in human rights comes only through war. To maintain its culture and the individual liberty of its citizens a nation must be prepared to fight for them. When the military ideals are lost, civic virtues soon follow, and the nation, like Rome and Carthage, falls into decay.

While other nations were more or less diverted from this primal social principle, the Teutonic races maintained it, even through the vicissitudes of subjection to alien conquerors. It is seen in the underlying *raison d'être* of the British Militia and the Colonial Militia, the precursor of the National Guard and Militia System of the United States. In Switzerland this military inheritance of tribal days is seen in much of its original purity. Every man is a soldier and though not

disturbed in his domicile and occupation he has to complete sufficient military training to enable him to discharge his patriotic duties in defense of his country in case of war.

The innate devotion of the Germanic peoples to full personal liberty prevented for many centuries their amalgamation into a great nation. The subordinate divisions of the race were even frequently pitted against each other and the absence of a united front subjected them to the devastations of their enemies. In the War of Austrian Succession 1741-1748 and the Silesian War of Frederick the Great 1756-1763 Germany was overrun from end to end by the contending armies of France, Russia, Austria, and the German States. The climax was reached in the campaigns of Napoleon in which from 1796 to 1814 the French armies were a scourge to the western German states.

The present national system is the development of Prussia. Spurred on by the disastrous war with France in 1806-1807 and by the terms of the treaty of Tilsit, the Prussians realized that their national life rested on a development of their military strength. They were limited by the above treaty to a standing army of 42,000 men. In

order to have available trained men in the numbers needed for the large armies to defend her home territory in case of war, Prussia adopted the system of short service of successive annual contingents, thus multiplying the available number of trained men far beyond the 42,000 of the standing army.

Under the plans and leadership of Scharnhorst, the Prussian Minister of War, the nation adopted in 1813 the system that for the first century in history maintained the Prussian territory free from invading armies in spite of the wars against Denmark in 1864, Austria in 1866 and France in 1870.

This system of military service was further developed under Germany's great organizer, Field Marshal von Moltke, who was Minister of War under William I, King of Prussia and first Emperor of Germany. To national training was added the quick striking power of the Prussian army which was responsible for the overthrow of Austria in 1866, and for the victory over the powerful regular army of the French in 1870.

This is the system that to-day enables Germany with a population of 65,000,000 to put in the field such enormous armies. As the sincerest flattery

is imitation, so is the value of the German system attested by its adoption by all of the leading governments of the world except the British Empire and the United States.

In Germany every man is born a soldier; from his earliest years a boy is regaled with stories of the deeds of his father and his relatives in service and in war. Even the home training is almost military in its discipline. The relaxing of parental restraint comes only with the entry into military service in the twentieth year. This date then marks for the boy the turning point of recognized manhood, and means for him far more than the "free white and twenty-one" for which the American boy longs.

Throughout life the military service is a bond of interest and a voucher of character. The man who has failed to perform his service in the army is looked on with suspicion as one who must have some physical or moral defect. He must be forever excusing and explaining his position to employers and new acquaintances. The military life pervades the nation; it is, in truth, in the words of the first emperor, "A Nation in Arms."

National military service is the cornerstone of the political structure of the Empire. One of the

first provisions of the national code reads, "Every German is in duty bound to defend his country, and he cannot discharge this duty through a substitute."

When a boy is born his name is entered on the military lists. When he reaches twenty years he may live far from his birthplace, but the call follows him and the fact of service is credited on the birth register. Defaulters are followed up through the various domiciles of their families and are severely punished if they ever enter German territory. So strong is the social obloquy that attaches to the quitter that there are practically no cases among the resident Germans.

The number of young men newly available for military service was 556,000 in 1907 and is now over 600,000. Economic reasons limit the standing army to about one per cent. of the population of the empire, which calls for an annual contingent averaging 260,000. About 10,000 are also taken annually for naval service. The remainder are not relieved from liability for service in case of war, but are assigned to the various classes of reserves that are described later.

The entire number of men who become due for military service in a given year are thereafter

listed as the class of that year. Thus the recent calling to the colors of the Classes of 1915, 1916 and 1917 means that the men who will reach their twentieth birthday in those years are being taken into the army ahead of time at ages of 19, 18 and 17 years, respectively. That is, all of the young men down to seventeen years of age are now in the German army.

The accepted recruits are assigned to the companies nearest to their homes and report for duty on October 1 of their year of service. All their ordinary clothes are left at home; they are furnished neat-fitting uniforms, and for the two or three years of their active service every thought is guided toward their duty as soldiers.

The course of training is a stiff one. It not only makes soldiers of the raw recruits, but it also makes men well developed both in physique and in appreciation of their responsibility to carry out well whatever duties may be assigned them either in the army or in their civil occupations. The ex-soldier is accordingly valued as an industrial employee.

On reporting for duty with their companies the recruits are divided into squads of four and are placed under a non-commissioned officer who

teaches them to march, face about, and to control their muscles readily for any movement. These squads are practically teams; the recruits are exerting every effort to qualify as soldiers and the corporal is rated on the results of his squad. All are enthused by the effort to win out in the competitive drill that is held at the end of the preliminary training period.

Next they receive rifles and are trained in the manual of arms and in close order drill. An under-officer (sergeant) is given a section of several squads and the competitive drills are repeated for another period. Progressively the platoon training and the company training are taken up on the same basis. The four platoons of the company are pitted against each other and later the four companies of the battalion. The winners are announced and for a time "crow over" the others.

From October to May this training is carried on with the aim of having the company in shape to take up regimental field training in the spring maneuvers. The summer training is especially directed to training and hardening the men in preparation for the great maneuvers in August and September when battle movements are car-

ried out under conditions as near those of war as possible.

For two years this thorough training proceeds. Not only does it cover marching, rifle firing and battle tactics, but it also furthers the education of the man. Classes are conducted in the various trades; in the winters, high school subjects are taught. Great importance is laid on physical development and every day the companies are put through drills in running, leaping and suppling exercises. Long marches are taken with every man loaded with the full war pack of rifle, cartridges, knapsack and blankets, in order to continually have every man in the "pink of condition" and hardened for the arduous service of war.

At the end of two years of this service the men in dismounted service—infantry, foot-artillery, and train—are furloughed and transferred to the active reserves. The men in the mounted services —cavalry, horse-artillery, and engineers—are held for a third year. Thereafter until their twenty-seventh year these ex-soldiers are classed as the active reserve and are at once called into service in case of war.

For peace training the units are kept at a smaller strength in war. The deficiency is made up on order for mobilization by calling in enough of the most recently furloughed men to fill up the vacancies. The exact peace strength differs from year to year, but the war strength of the units is fixed. The organization of the various arms is shown in the table below.

		Infantry			Artillery			Cavalry	
		Company	Battalion	Regiment	Battery	Battalion	Regiment	Squadron	Regiment
Peace	Officers	4	18	56	4	14	30	5	27
	Enlisted men..	142	571	1,768	128	386	774	135	695
War	Officers	5	22	68	5	17	36	6	26
	Enlisted men..	250	1,002	3,017	162	488	578	150	602

The remaining men, forming the majority of the active reserves, are definitely assigned to companies of reserve regiments that form reserve divisions to strengthen the armies at the front. The assignment lists are revised annually so that every man knows exactly his assignment. On furlough from active service every man's uniforms and equipment are bundled and tagged with his name,

and stored at the mobilization center nearest to his home. On receiving the call for active service he reports, draws his equipment, and is ready to move to the front. In order to keep every reservist up to date in his military training, he is called out twice during his active reserve period for maneuver service lasting from six to eight weeks.

The able-bodied young men not accepted from the annual contingents for service in the active army are not entirely excused from military service. About two-thirds are enrolled in the *ersatz* reserve, whose special function is to supply men to replace war losses so as to maintain the companies in the field at full strength. For twelve years they are carried in this reserve and during this time they are called out for a total of three periods of training, lasting ten, six and four weeks respectively. As they have grown up and lived in a military environment they are fairly well informed as to the elementary duties. On completion of the *ersatz* reserve period they pass into the *landwehr* and then into the *landsturm,* described below.

On the order for mobilization all of the ersatz reserves are mustered at the various training depots. Their training is rushed as fast as possible,

so that in a few weeks they are fit for service at the front. There they are mixed in with the battle-tried soldiers and quickly become dependable men. In this way the Germans get the full value of their fighting force in spite of a large percentage of recruits.

This contrasts markedly with the system followed by the United States in her wars. After armies at the front have been augmented by sending up newly recruited complete regiments. The trained regiments became ineffective through lack of numbers, while the regiments of recruits were almost useless until months of service had given them the experience that could have been picked the regiments first sent forward were depleted the up in a few days from the older soldiers if the recruits had been assigned to the older organizations.

The first German armies for war are made up of the standing army, the active reserve and the *ersatz* reserve. However, this is not the limit of Germany's available military strength. After completing his period of assignment to the active reserve, the ex-soldier is transferred to the second reserve, or *landwehr,* in which he is liable for service in the field armies until his 39th year. This

German infantry supports under cover, waiting to be fed into the firing-line as necessary

is divided into two *bans,* or levies: the first covering five years, 27 to 32, and the second covering seven years, 32 to 39. During the first ban the landwehr reserve is called out for two training periods of two weeks each, after which the reservist is subject to call only in case of war. For the mounted troops the landwehr service is divided into two bans of three years and nine years respectively.

Like the active reserve every landwehr reservist is definitely assigned to a company and regiment and his equipment is stored ready for issue on mobilization. When the active armies take the field in war the landwehr form the garrisons of the home fortresses and the coast defenses. They also furnish the armies to occupy conquered territory, to guard prisoners, and to assume every duty that will prevent the diversion of troops from the battle lines at the front.

The last line of the military system is the landsturm, the third reserve or "home guards." This force is also divided into two levies or bans. The first includes all men from 17 to 39 years of age who are not enrolled in any of the above classes. Finally, all men, both trained soldiers and untrained landsturm, are enrolled from their

39th to 45th year in the second ban of the landsturm. No special training is required of this reserve. When the landsturm is called out it relieves the landwehr, making the latter available for service at the front.

Besides the above, Germany provides a special class of one year volunteers from which officers and noncommissioned officers of the reserves are obtained. When a young man can pass an examination, about equal to that for our high school graduates, he is allowed to complete his active service in one year, provided his family bears all expense, not only of his support, but also of his military equipment. In this way the government reduces its expenditure and at the same time secures intelligent educated men for the subordinate officering of its reserves. It is noteworthy that nearly one-fifth of the men annually taken into the active army are "one-year volunteers."

The officers are recruited from two classes; first, the graduates of the military academies and, second, the high school graduates who have served in the ranks and have passed an examination equivalent to graduation from a military academy. Both classes then receive provisional appoint-

ment as ensigns, and are assigned to the war school for a further course of study and training. Upon graduation each ensign is assigned to a regiment for six months' service, after previous consent of its officers. After six months' service in the regiment its officers vote as to whether to accept him as an officer. If he passes this test he is commissioned a second lieutenant.

From second lieutenant up to general the promotion is regular, except that the Kaiser can award special promotion in exceptional cases. After reaching the grade of major a rigid elimination is enforced, large numbers of officers being transferred to reserve duties.

The officers of the various reserves are furnished from two sources. The senior officers and some of the juniors are transferred from the regular army by elimination as above or still more largely upon request due to business reasons. The company officers are appointed from one-year volunteers and exceptionally efficient regular service men who have followed a special course of study and training and have established their proficiency by passing prescribed tests.

ORGANIZATION

The typical infantry organization is four companies to the battalion, three battalions to the regiment, two regiments to the brigade, and two brigades to the division. The division is practically a small army ready for complete service. In addition to the two infantry brigades, it has a brigade of field artillery, a regiment of cavalry, an engineer battalion and sanitary and train troops. Its strength on a war footing is about 15,500 men.

Two infantry divisions form an army corps; to which is attached a battalion of siege artillery, a bridge train, and sometimes a cavalry division. The corps is a complete administrative unit both in peace and in war. The commanding general has final say in every question that arises, except dismissal of officers. Through his staff he provides for the supply of food, clothing, equipment and pay of the troops; his inspectors keep track of the efficiency with which training is carried out.

The German Empire is divided into twenty-four corps districts, each of which furnishes the troops for one corps of the active army. The

corps commander also has charge of the reserve service of his district. The twenty-fifth corps is the Guards Corps, stationed at Berlin, and is made up of specially selected men from all parts of the empire.

The detailed composition of an army corps is:

24	battalions of infantry	25,626 men
1	battalion of riflemen	1,035 men
4	regiments of field artillery, 144 guns	4,258 men
1	battalion of heavy artillery	675 men
1	regiment of cavalry	683 men
1	battalion of pioneers	600 men
1	telegraph section	
1	bridge train	
12	ammunition columns	
6	supply columns	
12	transport columns	
2	field bakeries	
3	ambulance companies	
12	field hospitals.	

Its total strength is in round numbers 41,000 men and 13,000 horses. However, this must be distinguished from its fighting strength, which is approximately 32,000 men. This difference is due to the enormous number of men required for the auxiliary services listed above. To keep the men at the front in condition to fight, they must be fed, furnished ammunition, and kept physically fit.

The 2200 vehicles, alone, take up a goodly part of these 9000 non-combatants.

The efficiency of the German army rests ultimately upon the great General Staff, composed of the best men in the army, obtained through a gradual selective system. This is divided into sections, each of which is charged with the oversight and improvement of a part of the military administration. They seek for improvements in arms and equipment, keep track of progress in other countries, obtain maps of all districts of probable campaigns, and plan maneuvers for the field training of the army. Especially important is their work in planning in the greatest detail the use of Germany's forces in case of war with her neighbors. This is studied out for every combination of opponents and allies and complete train service schedules are prepared for the movements of the regiments from their home stations to the assigned places for war. These are revised yearly. There is little question but that on July 30 last, the General Staff when notified of war, had only to direct the sending of the telegrams already written, addressed and filed, waiting for the call.

This system, combined with the efficient concentration system described later, enables Germany

to make the prompt delivery on her borders of armies superior in strength to her neighbors as shown by the operations at the beginning of the Campaign of 1914.

CHAPTER V

THE BRITISH SYSTEM

In the social struggles of the Middle Ages between the kings and the nobles of each country as to which should be supreme in the direction of the affairs of state, the levies of the nobles represented the militia of the country, while the dependence of the kings was placed on standing armies, largely mercenary. The supremacy of the kings led to the development during the Seventeenth and Eighteenth Centuries of the large armies of professional soldiers to which fighting was largely delegated.

In Great Britain both systems survived on somewhat divergent lines. The regular army represented the power of the king, the militia was the bulwark of the people. With the removal of fear of royal usurpation and with the increase in military demands due to the growth of the empire, the two military services have been drawn together to fill the need for a strong defense force and have almost coalesced.

Both regular army and militia are maintained by voluntary enlistment alone. In the regulars this enlistment is for a long period, the service being practically professional; in the Territorials it is for a shorter period. In both services enlistments may be renewed until the soldier is 39 or 40 years old, with the result that every company is made up of men of unequal ages and to some extent of unequal physique.

By the "Reserve Act" of 1907, Great Britain's military forces consist of the Regular Army, the Army Reserves, the Special Reserves, and the Territorials. The first two form the active fighting force. The special reserves have as their function the training of recruits to be sent to the front to keep the field army up to full strength. The territorials are the home defense force.

The regular army enlistment is for twelve years, but the soldier is not required to stay with the colors this full time. After three, seven or eight years, according to the branch of the service, he can apply for transfer to the army reserves for the remainder of his enlistment. This is encouraged by the government for in this way a reserve of trained men available for war is obtained without the expense of maintaining full strength.

On enlistment the new recruit is put in the "rookie squad" to learn how to carry himself, handle his rifle, and march. Then he joins the ranks of his company and goes through two years' training in field and garrison duties. Especial emphasis is laid on the summer training which is devoted to extended order drill, battle tactics, patrolling, outpost duty, and maneuvers under field conditions.

When the soldier enlists he has to go wherever the needs of the War Office may dictate. The majority of the regular army is held at home, but a large part is required to protect and maintain order in the colonies. The distribution of the peace strength in 1912 was:

British Isles	134,339
India	75,884
Other colonies	45,215
Total	481,365

This long service makes the British Army one of seasoned veterans that is probably superior to any other, man for man. Its great defect is its relative paucity in numbers as compared with the vast armies now used in war. While Great Britain is putting 260,000 men in the field in Eu-

rope, France from a smaller population can send to the front 700,000. In active reserves Great Britain falls still further behind, while of second line reserves she has none at all.

The soldiers transferred to the active reserve receive a small stipend and have to keep the nearest county office informed of their address. In case of war they report to the nearest recruiting office and are then assigned wherever men are needed. From this source Great Britain counts on augmenting her fighting force with 138,000 trained men.

The Boer War developed the need of having a home battalion to provide a steady supply of men to replace the losses due to battle and sickness. Indeed this was one of the principal objects of the Reserve Act of 1907. By it a special reserve is organized which provides a third battalion for every regiment of infantry. The members are required to have six months' preliminary training and to attend a two weeks' camp every year. They continue their civilian vocations, but are called into service on mobilization for war. This third battalion does not go to the front, but forms a depot for maintaining the fighting strength of the two battalions in active service.

This "special reserve" furnishes also the depot units for cavalry, field artillery and the other arms, performing like functions in maintaining the fighting strength of the active unit. The special reserve has been still further developed for the infantry branch, and provides enough additional battalions to furnish a fourth one to some of the regiments. This battalion does not take the field at once, but can do so after a short training period on account of drawing on the depot battalion for its best material.

The special reserve furnishes an immediate strengthening of the field army by providing, in addition to the above, a large part of the men to man the supply service of the army. This service requires a large percentage of the enrolled strength, about one man in five. Men direct from civil pursuits can take hold readily of these duties and thus release the trained soldiers for the service on the firing line. These auxiliary services include not only the forwarding of the immense quantities of food required for armies, but also cover the furnishing of ammunition, clothing, medicines, tentage, horses, and the performance of the clerical duties at the various headquarters.

The Territorial Force corresponds to the Na-

tional Guard in the United States. The men drill on special dates throughout the year and every summer have a week or two in camp. They may be sent anywhere in the Empire for service, but may not be sent beyond its limits except with their consent. They are primarily a "home guard" force.

The territorials are administered and are largely maintained by the County Associations under the supervision of the War Office. For their summer camps they receive the same pay as the regular army. Enlistment is for four years and may be repeated until the man is forty years old. They are organized, on the same system as the regular forces, into fourteen divisions and fourteen cavalry brigades. The officers hold permanent commissions and are tested and trained by field service in summer, and by examinations for promotion. The total strength of this force in 1912 was 315,408 men.

On mobilization for war the fourteen divisions of territorials are called out for active service and are gathered in division camps near their home districts. A strenuous course of training is followed in marching, shooting and maneuvering under campaign conditions. The British plan pro-

vides six months of this training as a prerequisite for the arduous demands of field service.

The territorials, however, augment the military strength of the nation from the day of the first call. Members who have had experience in active service are allowed to transfer to the regulars and volunteers for immediate service at the front. Others transfer to the supply services. The home garrisons of regulars, replaced by territorials, can be sent with little delay to join the fighting force. And the territorials can also be sent to garrison oversea stations, such as Bermuda, Gibraltar, etc., releasing their garrisons of regulars for further reenforcement of the armies at the front.

It is of especial interest to Americans to follow the use made by Great Britain of her military forces. Our system is founded on the same lines, and will, in following the innate principles of our social system, develop on similar lines to those of the British. When we see how small the army of Great Britain is in comparison with the hosts of France, Germany, Austria, Russia and Japan, it makes us realize the great weakness of the United States in case any nation should consider that our policy conflicts with its interests.

For the further development of military

strength Great Britain has to depend on volunteer regiments raised for the war. By assigning to some of these, only men who have had experience in service, she can get a few regiments available for early service, but the bulk of the volunteers will be entirely raw troops. Without the elementary training necessary to fit them to take care of themselves in the field, they would merely clog up the hospitals and die in droves without adding proportionately to the strength at the front.

The British have profited by the ill-success of the American policy with its enormous waste of lives due to the system of allowing untrained troops to "spring to arms" and to rush to the front without knowledge of either tactics or sanitation. It is far within the limits of actual possibilities to state that one-half of the sick and dead could have been saved in the Mexican War, the Civil War, and the Spanish War if our people had realized the seriousness of war. The urgent popular cry of "on to the front" has caused more suffering and deaths than have all the bullets of our wars.

Great Britain avoids this by requiring a rigid course of training. The men are allowed to "spring to arms," but they are held in training

camp for six months. Without training in shooting and marching a soldier is of little value on the firing line. But without training in cooking, care of food, feet and body, care of his own health and that of all around him, the soldier will have little chance to get as far as the firing line. It takes time to impress all of this on the recruit. He has to learn an entirely new system of living in addition to learning a new trade. The greater the civilization of the nation, the greater will be the time required for adaptation to the rough and almost savage conditions of life in campaign.

Out of the call for 300,000 volunteers at the beginning of the European War, the British have probably obtained over 100,000 veterans of service, ready to go to the front after a few weeks to get back into training. The remainder of the first call, and practically all of the second call of 500,000 volunteers must be trained in first principles before they can augment the British military strength.

In military resources Great Britain has well over 5,000,000 men. In military strength, in men ready for service in her armies at home, she has less than 700,000. Either Italy or Japan could overwhelm her in two months if they could reach

her. Her military strength lies not in her 5,000,000 young men, but in her navy that gives time for her military resources to be converted into military strength.

The British military forces consisted in 1912 of:

Home Regular Army, peace strength		134,339
Army Reserves		138,000
Special Reserves		87,927
Home Regular Forces		360,266
Regular Army in India		75,884
Regular Army in other Colonies		45,214
Total Regular Forces		481,364
Territorials, British Isles		315,408
Canada: Permanent Force	5,000	
Active Militia	62,037	
Reserve Militia	39,346	106,383
Indian Army		162,000
Australian Militia and Regulars		46,400
Total		1,111,555

The militia of South Africa, New Zealand, and the smaller British Colonies will add at least 100,000 more men of various degrees of military training.

CHAPTER VI

MOBILIZATION AND CONCENTRATION

The wars of the last half century have shown that a nation cannot depend upon her standing army alone for defense. It can serve only as a first line to delay operations until the manhood of the nation can be organized into armies and moved to the threatened points. This involves two operations; first the companies must be enlisted to full strength and assembled into regiments, and, second, the regiments must be transported to the place assigned them at the front. This places them as part of a definite division, corps, and army.

The mobilization is greatly facilitated if skeleton organizations have been provided in time of peace and if trained men are available to fill up the companies. All that they then need to fit them for war is a short period of training to enable them to gain team work. This is the object of the great reserve systems of all the leading countries of the world except the United States.

When war is imminent an order is issued for mobilization on a war footing. The first efforts are directed to raising the active army to full strength and dispatching it to the front, and only when its mobilization is well started, is that of the first line or reserves commenced. The successive lines of reserves are in turn taken up; as one perfect unit is worth much more than two unformed ones, each line is fully provided for before the next is called.

The protection afforded Great Britain by her navy has relieved her of the necessity of such vast development of reserve military strength as is found on the continent. Her regular army and reserves include only a small percentage of her young men of fighting age. Her territorials might be considered as corresponding to the landwehr, or second reserve, of the continental systems. For the bulk of her fighters in a great war she has to depend upon newly organized volunteers. As these would be worse than useless unless trained in the elementary principles of field service, her war policy must provide for a delay of six months or more before her full military strength can be brought to bear.

THE BRITISH SYSTEM

On the proclamation of the king commanding the mobilization of the British army, all of the reserves are at once summoned to the colors to fill up the fighting arms to war strength. The supply service is manned by the special reserves. The reserve (third) battalion of each regiment takes the stations from which the two active battalions are moved and forms the depot battalion. They make good the losses of the two battalions at the front and train the newly enlisted recruits.

The extra reserve battalions form fourth battalions for the regiments and are at once available for field service.

The mobilization proclamation calls the Territorials into active service, and provides a force 315,000. These men have learned the rudiments of military training in their armory drills and in the two weeks of annual camp, but time and training are needed to fit them for the arduous duties of campaign. The British system provides for a six months training period for this purpose.

This system makes about four fifths of the regular army at home stations available for early service at the front. As the home army totals 180,000

and the army reserve 150,000, Great Britain's "quick striking" force is about 260,000 men.

The value of the Territorials is also realized in advance of the six months' training period in two ways. Members of the Territorials who have had experience in the regular army or in campaign are permitted to transfer to the regulars or volunteers. Still more important, the Territorials may be sent to garrison outlying stations of the Empire, releasing the garrisons of regulars for service at the front.

Since all of the above sources provide only about 800,000 men, Great Britain is forced to have recourse to newly recruited volunteer organizations in order to form the armies needed for a great war. These are entirely recruits, except for a sprinkling of officers of some experience. A long training period is needed to work them into shape.

The Territorials, special reserves, and volunteers are assembled in great camps, as at Aldershot, where every effort is made to hasten their training. At the same time the administrative and supply reserves are organized and gradually gotten into smooth running order for discharging the immense task of controlling and supplying such numbers of men.

The essential feature in which the British or the American mobilization differs from that of a continental nation is that the greater part of the organization has to be carried out after the war has already started. Time is necessary to properly coordinate the many departments of work and excessive haste means only waste and weakness. The full development of military strength by this system demands as a prerequisite the delay by some means of the enemy's invasion for a six months' period.

CONTINENTAL SYSTEM

For the nations on the continent of Europe the onset of an enemy's army must be met with little delay; indeed quick striking power is more important than military resources in gaining victories. This is well shown in the Seven Weeks' War of Prussia and Mecklenburg against Austria, Bavaria, Hanover, and Saxony in 1866. The underlying cause was the desire of Prussia to oust Austria from the German Confederation and to inherit her hegemony. Prussia's population was in round numbers 19,000,000 while that of Austria was 35,000,000; including the allies on both sides the populations were 23,000,000 against 49,000,000.

But against the superior resources of the Allies, Prussia had her wonderful rapidity of mobilization and concentration due to the careful planning of her Minister of War, von Moltke.

War was declared by Austria on June 17 and her armies moved north in the effort to take advantage of the salient of Bohemia and Moravia for an advance on Berlin. The Prussians concentrated in three armies near Gorlitz and Glatz in Silesia and Torgan just north of the Saxon border. So carefully had von Moltke followed the Austrian movements that he was able to hasten the final Prussian concentration by keeping the armies separated until the very day of the great battle. On July 3 the three Prussian armies, united on the battlefield of Koniggratz, and so decisively defeated the Austrian regular army that the defense of Vienna against the Prussian advance was hopeless. On July 26 hostilities were suspended and the preliminaries of peace were signed. In less than seven weeks Prussia by the "quick striking power" of her military system had overthrown Austria and her allies in spite of their apparent superiority in military strength and resources.

The Prussian system has since been copied by

all of the Continental Powers, and may be taken as a sample of all. The basic principle is that every man must have a definite assignment for war, that his equipment must be stored waiting for him, that he must report at a definite place to join his company and to be outfitted, and above all that every plan be checked up every year and revised so as to be always up-to-date.

The present German system may be taken as typical. The twenty-four corps districts are each divided into four brigade districts, which are in turn divided into four to six landwehr districts, immediately charged with the records and duties of maintaining the preparedness of the reserves for prompt mobilization. The landwehr district is under a field officer of the retired list of the army who has a sufficient staff to carry on the many duties of the office. This district headquarters does not take the field in case of war, but remains to provide for calling out the successive lines of reserves and for training and forwarding the recruits for the armies at the front.

At the district headquarters are kept complete lists of every man in the district of military age 17 to 45, including his age, reserve assignment, occupation, residence, and every item of military

value. The men who are to be called to fill up the active army to war strength are on one roll, those for each reserve company on another, those for each landwehr company on yet another, and similarly for the ersatz reserves and the landsturm. Notices are made out for every man; the method of notification whether by wire or messenger is selected; even the route by which the man is to proceed to the designated assembly point is exactly laid down. Nothing is left to chance. Every detail is covered. To provide for natural changes the whole system is revised annually.

The district headquarters is largely a record and administrative bureau that starts the mobilization going. The work is then taken up and carried on by the reserve officers called into service. These men are obtained by transfer from the regular army or by promotion from the ranks as described in Chapter IV. Each officer has his assignment, has to learn by heart his duties for each of the eight days assigned to mobilization, and is tested at definite intervals on his ability to do his part.

The reservists are collected in groups near their homes and under a sergeant proceed to their company station. Here they are issued the equip-

ments held in store for them and are put through drills to get them back into training. Wagons and company equipage are drawn from the storerooms, draft animals are commandeered, and the organization stands ready to move to the front; that is, has completed its mobilization.

In order to obtain the enormous amount of transportation required for an army in the field the landwehr district officer keeps a record of every animal, and vehicle in his district. A special bounty is given to owners of horses and automobiles that answer military requirements. A yearly assessment of value is made and part of the mobilization includes summoning the owners to deliver their animals and vehicles at designated points.

It is readily seen that the resources of the district are strained to the limit to secure the rapid despatch of the active army to the front. The reserve divisions follow close behind. At the same time the youths and the ersatz reserves are called into the depots to be ready to maintain the fighting strength of the fighting armies. The successive classes of reserves are notified to be ready and are called out, each as the mobilization of the preceding class is effected. The reason for the

successive calls spread over many days, is apparent.

The stages of mobilization are well illustrated by that of the German army for the war against France in 1870. "At the opening of the Franco-German war, the army of the North German Confederation numbered about 304,000 men. The plan of mobilization called for a field army of 578,000 men, 159,000 horses, and 1284 guns; a depot force of 194,000 men, 23,000 horses, and 246 guns; a reserve and garrison force of 209,000 men, 17,000 horses, and 162 field guns.

"The order for mobilization was telegraphed from Berlin on the night of July 15, and the following day, three days before the declaration of war, was appointed for the first day of mobilization. On the first and second days the calls were issued for the reserves, men on furlough, and the owners of horses, and the regiments began sending details to bring back their quotas. In the infantry, on the third day arms and ammunition were drawn from the artillery depots, and carriages and harness were made ready for the horses. On the fourth day the horses arrived, and the infantry field trains were organized. On the fifth day the men on furlough returned and were equipped. On

the sixth and seventh days the reserves appeared and were armed, clothed and equipped; each man had been allowed twenty-four hours' delay to arrange his affairs. On the eighth day the regiment was reported ready for field service.

"Cavalry and field artillery required a day or two longer than infantry, and the organization of the siege, engineer and general supply trains, a few days more than the mounted services. However by the evening of the eighth day, the mobilization of the field army was so nearly complete that its transportation to the front was begun the next day, July 24.

"While the field army was being mobilized, the depot troops were being formed. Each infantry regiment formed a depot battalion, each cavalry regiment a depot squadron, and each regiment of artillery a depot battalion; the other services also organized their depot units. The depot troops were, as a rule, composed of partially instructed recruits and ersatz reserve men. The reserve and garrison troops were formed of the extra reserve and landwehr men; the youngest classes were assigned to reserve battalions, and the oldest to the garrison troops. The number of extra men of the reserve and first contingent of the landwehr fur-

nished about two battalions of reserve troops for every regiment of the field army." [1]

When the troops are trained and fully equipped with arms, ammunition and a smooth working supply service, they are ready to take care of themselves in the field. They can be moved about as needed; that is, they are mobilized.

The next step is to bring together the scattered regiments into divisions and corps, and the concentration of these in armies at the front. Where the troops are trained and the working of the division organization has been tested in frequent maneuvers, the two steps above outlined can be combined and the regiments can be moved direct to their places at the front, the divisions, corps and armies being assembled all at the same time. The concentration is necessarily a period of vulnerability. To protect their armies while the commanding general is making sure of having them well in hand, the leading continental powers have constructed extensive border fortifications.

Where the corps are not sufficiently organized and trained for field service the concentration is carried only as far as division or corps camps where the newly organized regiments are broken

[1] From "Strategy," by Col. G. J. Fiebeger.

in and the men are taught to shoot, march and take care of themselves in campaign. Such were the great camps of the Army of the Potomac organized under McClellan in the winter of 1861-1862 and the camps of the various corps in 1898 at Mt. Gretna, Falls Church, Augusta, Mobile, St. Augustine and Tampa. Great Britain now has the great majority of her military forces in such camps, where they are getting the training and outfitting necessary for service at the front.

The concentration of the armies on the border is planned by the General Staff of the country. The problem is so enormous that it cannot be realized until one begins to take count of the details. The first need is rail or water transportation. One hundred and fifty separate trains are required to transport the men, animals, guns, wagons and necessary baggage of an army corps. A single track railroad can handle only about fifty trains a day in one direction, so more than three days single track service is required for every corps transported. And after arrival, a steady supply of food, ammunition and recruits must be forwarded to maintain the fighting strength of the army. This great rail problem is the simplest part of the transportation and supply, for it is

definite and can be planned ahead of time. The difficult part comes after leaving boat or train, when the armies have to spread out over broken country and the enormous supplies have to be forwarded by wagons and automobiles.

So much is the strategic planning of concentration dependent upon rail lines that both France and Germany have in the last generation spent large sums in building connecting links so that the commercial rail lines would service the military demands. Since 1909 Germany's special efforts have been the construction of a number of freight yards and long sidings, to facilitate the detraining of troops in Lorraine between Metz and the Saar River and in Rhenish Prussia between Dusseldorf on the Rhine and the Belgian frontier. One of the conditions of the French loans to Russia in recent years has been that a portion should be spent to improve the rail facilities for moving troops into Poland.

The units must be kept together in the concentration; the ten trains required for an infantry regiment must follow closely behind each other. Time schedules are made out for every move: from barracks to the station; entraining; start of train; meal stops; arrival at destination;

detraining; march to camp or cantonment. Train schedules are prearranged, providing for rapid forwarding of trains in the ruling direction, and for the prompt return of empties. An enormous amount of detailed work is necessary in order to provide for the maximum use of all rolling stock and the minimum delay in movement of troops.

On the outbreak of war all the railroads of the continental nations are put under military control. Until the active armies have been moved to the front, the entire service is devoted to this end. Thereafter the supply trains have right of way, but it is possible also to carry some commercial traffic. When the reserve armies have completed this mobilization, the railroads are again, during this movement to the front, monopolized by the military service. There are then successive periods of entire stoppage of ordinary traffic followed by periods of limited commercial service.

In the concentration of corps to form armies there is a limit to the number of men that can be controlled by one commanding general. He must carry in his head the location and duties of each superior unit of his command, through the constantly changing conditions of the campaign.

The Second German Army in 1870 had at first seven infantry corps and one cavalry corps, but it was broken up into two armies after Metz was reached. Six army corps, or 250,000 men, seems to be of numbers for effective control.

One of the most effective concentrations of recent wars was that of the Germans in 1870. Their reserves were called out July 16. Each corps was mobilized in the district from which it was recruited, and the troops were moved according to prearranged detailed plans from their districts to the points of concentration, in the Bavarian Palatinate, protected by the fortresses at Coblentz, Mayence, and Germersheim in their rear. Their first attitude was defensive, but as concentration was completed, and the expected offensive movement of the French failed to materialize, the Germans secured all the advantages of the initiative.

Their armies were organized as follows:

The First Army, on the right, consisted of the VII and VIII Corps, and one cavalry division, and was later reenforced by the I Corps and another cavalry division, bringing its strength to about 85,000 men and 270 guns.

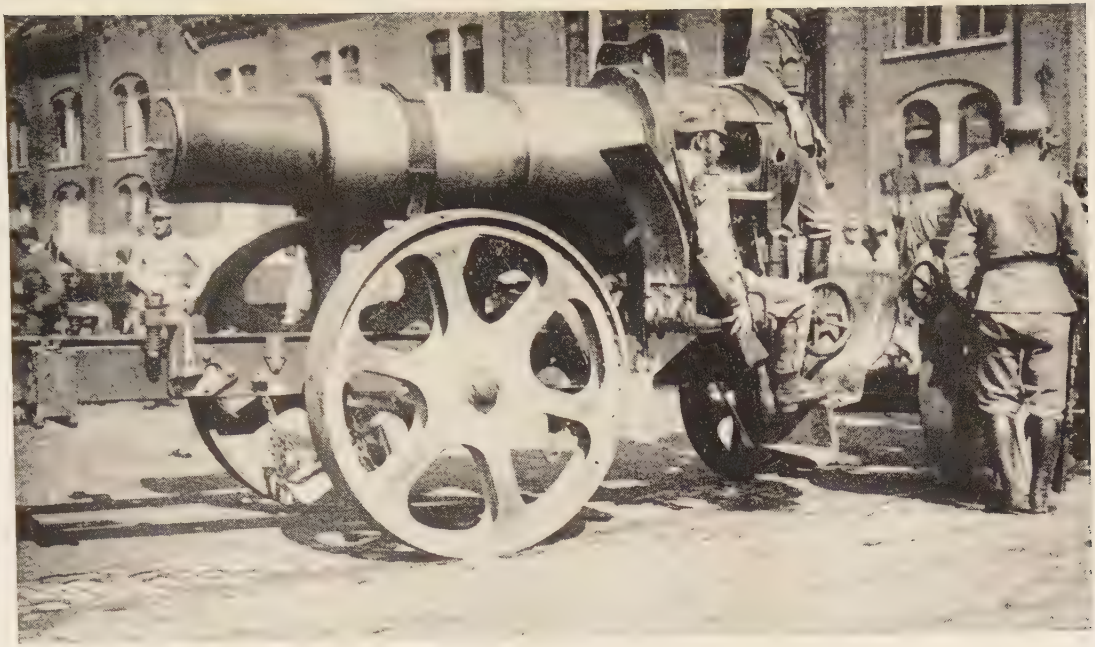
The Second Army, in the center, consisted of the III, IV, X and the Guard Corps with two cav-

alry divisions, and the cavalry of the Guard Corps. It was later reenforced by the II, IX, and XII Corps, bringing its strength to about 200,000 men and 630 guns.

The Third Army, on the left, was composed of the V and XI Prussian Corps, the I and II Bavarian Corps, the Baden and Wurtemburg divisions, and one cavalry division. It was later reenforced by the VI Corps and one cavalry division, bringing its strength to about 175,000 men and 576 guns.

The concentration was ordered as follows: First Army at Wittlich in front of Coblentz; Second Army at Homburg in front of Mayence, and the Third Army at Landau in front of Mannheim. This was practically completed on the Rhine from Coblentz to Mannheim by July 31, and on August 3, the line Carlsruhe-Landau-Kaiserlautern-Neunkirchen was occupied by the Second and Third Armies, with the First Army threatening Sarrelouis.

This concentration of 320,000 men and 1000 guns in eighteen days, reenforced to 460,000 men and 1476 guns four days later, armed and fully supplied for a successful offensive campaign, surprised the world. With the improvements in transportation the concentrations of the present



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Type of heavy German artillery facetiously termed "Black Marias" and "Jack Johnsons" by the English soldiers

war brought together still greater armies in equal time.

The problems of the countries engaged in the European War of 1914, in the concentration of their armies on their borders may be well understood by marking on a map the peace locations of their corps. The administrative centers are:

France: I Corps, Lille; II Crops, Amiens; III Corps, Rouen; IV Corps, Le Mans; V Corps, Orleans; VI Corps, Chalons-sur-Marne; VII Corps, Besançon; VIII Corps, Bourges; IX Corps, Tours; X Corps, Rennes; XI Corps, Nantes; XII Corps, Limoges; XIII Corps, Clermont-Ferrand; XIV Corps, Lyons; XV Corps, Marseilles; XVI Corps, Montpellier; XVII Corps, Toulouse; XVIII Corps, Bordeau; XIX Corps, Algiers; XX Corps, Nancy.

Germany: Imperial Guards, Berlin; I Corps, Koenigsberg; II Corps, Stettin; III Corps, Berlin; IV Corps, Magdeburg; V Corps, Posen; VI Corps, Breslau; VII Corps, Münster; VIII Corps, Coblentz; IX Corps, Altona; X Corps, Hanover; XI Corps, Cassel; XII Corps, Dresden; XIII Corps, Stuttgart; XIV Corps, Carlsruhe; XV Corps, Strassburg; XVI Corps, Metz; XVII Corps, Dantzic; XVIII Corps, Frankfort-on-

Main; XIX Corps, Leipsic; XX Corps, Allenstein; XXI Corps, Saarbrucken; I Bavarian Corps, Munich; II Bavarian Corps, Wurzburg; and III Bavarian Corps, Nuremburg.

Austria: I Corps, Cracow; II Corps, Vienna; III Corps, Graz; IV Corps, Budapest; V Corps, Poszony; VI Corps, Kaschau; VII Corps, Temesvar; VIII Corps, Prague; IX Corps, Leitmeritz; X Corps, Przemysl; XI Corps, Lemberg; XII Corps, Hermannstadt; XIII Corps, Agram; XIV Corps, Innsbruck; XV Corps, Sarajevo; XVI Corps, Ragusa.

Russia draws recruits for each corps from territorial districts but stations them near the western border. Before the outbreak of the war the distribution was reported as: First Army, St. Petersburg, 6 Corps; Second Army, Vilna, 4 Corps; Third Army, Warsaw, 4 Corps; Fourth Army, Kiev, 5 Corps; Fifth Army, Odessa, 2 Corps; Sixth Army, Moscow, 5 Corps; Seventh Army, Kazan, 2 Corps, and Ninth, Cancasia, 3 Corps. There were also 5 Corps in Eastern Siberia, and 24 cavalry divisions distributed among the above stations and the district of the Don.

Great Britain is divided into seven commands

with headquarters at Aldershot, Tidworth, London, Dublin, Chester, York and Edinburgh. The Aldershot command includes an army corps maintained in readiness for prompt despatch to any seat of war.

The publicly announced dates for the mobilization of the active armies and reserves in the great European War were: Austria on July 25; Russia on July 29; Germany on July 31; France on August 1; and Great Britain on August 4.

CHAPTER VII

TRANSPORTATION AND SUPPLY

So enormous are the supplies that must be furnished to armies of the size with which modern wars are fought, that their campaigns are largely governed by this consideration. In the days of Napoleon great wagon trains were formed with convoys of troops to protect them during their march to the front. The break down of this service due to the failure to make proper allowance for the difficulties of traversing the dirt roads of Russia was principally responsible for the collapse of the campaign to Moscow in 1812. Prior to the last decade campaigns of large forces were entirely limited to theaters that could be readily supplied by rail and water routes. The development of automobile transport extends this sphere to include regions of paved roads. But not even this improved transportation can overcome the obstacles of mud or mountains.

In the American Civil War President Lincoln was particularly interested in the advance of the

Northern armies from Cincinnati to Knoxville, in the valley of the Tennessee, in order to support the local population that was largely Unionist in sympathies. Every commanding general was urged by the President to prosecute this campaign. In spite of every support of numbers, equipment, supplies, and administrative backing, every general reported this move as an unwise waste of forces due to the impossibility of maintaining supplies when dependent solely upon wagon transport along the long line of communications over the dirt roads of the low country and over the rocky roads of the mountains. Due to a rail route for supplying the army it was a less difficult military problem to conduct a campaign of 600 miles through Louisville, Nashville, and Chattanooga to Knoxville than it was to advance 250 miles on the direct line over the mountains.

So dependent are military operations upon lines of railroad that the major portion of the rail development of central Europe during the last sixty years has been determined in route and location by military requirements rather than by commercial needs. A glance at a map of Germany will show a network of railways in Alsace and Lorraine, although the commercial demand is very

small. Between Cologne and the Belgian border is another similar network, but one more warranted by the amount of local traffic. One of the French conditions for the large loans to Russia in recent years was reported to be the construction of strategic railways to the Polish border.

Not only are railroads necessary for the supply service, but also for the rapid transportation to the front of the corps that form the army. So absorbing is interest in the activities of the troops after their arrival at the front that we overlook the problem of transporting them. To move one single army corps with its supplies and field transport requires 160 railroad trains. These cannot be moved forward one behind the other; they would congest the track for twelve miles. An experience like this occurred at Tampa in 1898 during the despatch of the first expedition to Cuba. This small movement of 17,000 men swamped the rail facilities of the Florida seaport. Every switch was filled, yet cars were stacked up along the track for miles.

The main line of the railroad is not the only need; there must also be an ample supply of side tracks long enough to hold a complete train so that all cars may be unloaded at once. For the

prompt and convenient concentration of a corps one hundred and sixty of these side tracks would be required. But each separate command of the armies of a large nation contains four to six corps. A careful time chart must, then, be worked out for routing trains in both directions so as to get the empty cars out of the way of the loaded trains. And this reduces the capacity of the railroads so that the rate of concentration at the frontier becomes approximately an army corps every three days for every single line of track.

In this preparation for concentration Germany leads the world. Since 1909 her principal rail development has been the construction of great concentration yards at the rail centers in Lorraine and in Rhenish Prussia. France followed suit in the district south and east of Nancy, but had not provided facilities equal to those of the Germans when the War of 1914 broke out. It was this provision for the rapid delivering of armies on the border that aided Germany in concentrating such enormous armies on her frontier within a few days of the outbreak of war.

In the transportation of such immense armies as are involved in this war every detail must fit in like clockwork. If any clog slips it may stop the

whole works. Plans are made up far in advance and are kept up to date by yearly revisions. A schedule is made out for days counting from the date of the mobilization order. Every day has its assigned duties for every organization in preparation for mobilization and for entraining. The complete time schedule for the train is prepared ready for use when the state takes over the railways for the war service. The destination of every regiment is planned, as is the assignment of its units to the twelve trains required for its transportation. The exact hour of departure is scheduled, and so are the times and places for taking on water and coal, for passing other trains and for stopping for meals for the troops. Even the stations at these meal stops are prepared to furnish definite amounts of water, coffee, and hot soup at definite times to the troops as they come through. The stop is only for time sufficient for each man to fill his canteen, cup, and pan; bread is served and the meal is eaten while under way.

All of these plans are completely prepared to the last detail by the branches of the General Staff and the Supply Corps during times of peace. Every regimental commander has his complete orders filed at his headquarters. Just as the

British fleet was started against Germany by a brief wireless, reported as being "Go ahead," so at the outbreak of hostilities the War Office of each nation needs only to send a short message directing the execution of the orders already filed.

The influence of rail routes on campaigns is most notably shown in the Manchurian campaign of the Russo-Japanese War of 1904-1905. The whole fighting was limited to the one single track railroad from Dalny north to Mukden. The battles consisted of contending lines squarely across the railroad, while the few detached moves were based on the railroad and were sent out only far enough to maneuver against the enemy's flank.

Next to railways, water routes are most necessary for military campaigns. The importance of navigable rivers in facilitating the advance of armies is shown in the two-year campaign against Vicksburg, where the advances by land were checked at Shiloh, Iuka, Corinth, and Holly Springs. It was only after control of the Mississippi was gained that the advance down the river enabled the Union Army to successfully carry out the campaign that had seemed well nigh hopeless by land.

In Grant's campaign against Richmond in 1864

his plan of campaign was based on keeping in touch with water transportation. At Spottsylvania Courthouse his army was based on Acquia Creek and the Potomac River; for the next advance the base was moved to Port Royal on the Rappahannock. Later it was moved to West Point on the York River, and finally to the James, as the successful advance reached the vicinity of Petersburg.

Command of the sea is of immense strategic value in enabling the dominant nation to strike where it will. Such was the condition that enabled Great Britain, during the Seven Years' War of Prussia and Great Britain against the rest of Europe to capture and hold her present great dependencies, Canada and India. It was British naval predominance again during the Napoleonic era that protected the nation from the fate that overtook the continental countries.

In the campaign under General Kitchener in 1898 for the reconquest of Khartoum and the Soudan the essential factor of the British success was the use of the Nile for transportation, supplemented by the special military railroad built during the campaign to parallel its banks and to carry supplies around its rapids.

Whether the supplies be forwarded to the advanced base by rail or water the final distribution must be made to the companies by wagon or autotruck. The wagon has the advantage that it can get through almost any difficulties of road or ground, where the auto would be hopelessly stuck. The autotruck, though, can carry as much as five wagons and can go ten times as far. When the mules or horses are tired at the end of their fourteen mile haul the wagon must stop. The automobile, however, needs only a change of chauffeur to keep going, as long as gasoline and a relief of chauffeurs can be provided. For a country of well developed highways like France or Germany the auto facilitates greatly the supply and also the transportation of troops. It supplements and augments the rail service and increases enormously the mobility of armies.

For the maintenance of the fighting strength of the army at the front it must be furnished a steady supply of food and a sufficient store of ammunition to keep it always ready for vigorous physical efforts and for the fullest possible development of rifle and artillery fire. A man can easily fire 300 rounds of rifle ammunition during a battle, while a field gun is limited only by the number of shells

that can be supplied during the course of the engagement.

No country can hope to manufacture during wartime the large amount of ammunition used up in the first battles. It would cripple her armies from the start and would expose them to defeat by equal forces aided by better equipment. After a couple of months of war the factories can expand their facilities sufficiently to supply the steady demand, but the munitions for the first few weeks must be provided in times of peace and stored ready for war.

Complete stocks of rifles, field guns, and their accessories are manufactured or purchased in sufficient numbers to equip the largest armies that the nation will have call to put in the field. They are then labeled for assignment to special organizations on mobilization and are stored in separate groups, ready for prompt issue when the emergency arises.

Food supplies are more difficult to store, but are more easy to obtain in case of need. Consequently no large stocks are maintained in times of peace except at the fortresses along the frontiers. Since the headquarters will be strained to the limit by the ordinary demands of mobilization

and concentration, it can ill afford at this urgent time to be burdened with the provisioning of these strongholds. Consequently each fortress maintains even in peace times a store of hard bread, salt meat, flour and dried vegetables, sufficient to subsist its garrison for several months in the event of a siege. In this way the forts form supporting points along the frontier, ready to check and delay any sudden invasion of the enemy, thus gaining time for the concentration of their own armies in rear.

Such a function was performed by the fortress of Metz in 1870, which by its control of the direct railroute, delayed the German advance on Paris until their military engineers could construct a by-pass from Remilly to Pont-a-Mousson to carry their trains past Metz without coming under the fire of its forts. Such also was the part played by Liége and Namur at the outbreak of the present war.

In order to be ready for war the supply department must keep track of all available food supplies and must be prepared to obtain prompt possession, of such as would be needed on the call for mobilization. In order to provide for the large and continuous demands when the armies

take the field, great depots are formed at the rail centers, where provisions of all sorts are collected. These are then forwarded as needed to advanced bases close to the battle line.

When large armies are in the field they will quickly eat up all stocks of provisions if the communication with the home depot is broken. At the same time they cannot be burdened with the immediate care of large stocks of stores that would not be needed for a number of days. Such excessive trains appreciably limit the mobility of the command and detract from its fighting value.

It was this factor that helped to delay the success of the British campaign against the Boers in 1900. The Boers lived on a simple ration, largely collected in the theater of operations, while the major part of the British columns were incommoded by long trains carrying the supplies which their troops were accustomed to demand. The lighter equipment enabled the Boer commandos to attack in one place, and then move rapidly to deliver another attack in another district. This activity made it necessary for Great Britain to send to South Africa a force several times the strength of the Boer armies before she could overcome them.

While the army must reduce its baggage trains to the minimum, it must also take precautions against a failure of the supply of food. This is done by the maintenance of the advanced bases at the railheads or at the nearest boat landings. From this point the supplies are sent forward in trains of wagons or automobiles, which are organized so that each train carries enough rations for one division for one day. A constant stream of trains between the advanced base and the front is thus kept up, the aim being to keep always within reach of the troops enough rations for three days. The schedule of service is laid out so that a loaded train will arrive at the front just as the one already there is emptied of its stores. This latter then returns to the base to replenish and to continue the service.

So important is the safeguarding of an army's supplies that it demands a care and attention only exceeded by the strategic planning of maneuvers to defeat the enemy. The feeding of an army is necessary to its fighting; the best of troops cannot survive the physical weakening and moral strain consequent upon deprivation of proper nourishment. The general in command, while watching the enemy in front, must also keep an eye on his

line of communications, for any move against this line threatens him in a vital point. The line of communications is like an artery nourishing the arm; if the artery be cut, the arm loses its striking power. Only if the flow of blood be quickly restored, can the limb be saved from destruction and its fighting power be restored.

At all times the supply trains en route to the front require a guard to prevent thefts, and when in a hostile territory this protection requires a large armed force. The trains stretch over a great deal of road, about one mile to every 100 vehicles. When in an invasion the trains are exposed to raids of the enemy's cavalry, their defense may require a small army. Their capture may seriously influence the whole campaign.

In the invasion of Austria by Frederick the Great in 1758 his campaign was defeated and he was forced to abandon the siege of Olmutz on account of the capture of a great train of 3000 wagons. In the consequent retreat to Prussia he had to detach one half of his army to protect the 4000 wagons that carried his war materials and supplies.

In 1846 at the beginning of the Mexican War,

General Taylor found the supply of his army on the Rio Grande opposite Matamoros so threatened by the Mexican detachments in his rear that he had to take his entire army, except one regiment, to march back 25 miles to the base at Point Isabel in order to bring forward in safety the supplies needed for the maintenance of his troops.

In December, 1862, Grant's campaign against Vicksburg had advanced to Oxford, 200 miles south of his base at Columbus, Kentucky, and 30 miles south of his advanced base at Holly Springs, Mississippi. In the last two weeks of the year the Confederate cavalry leader Forrest cut his communications by destroying 60 miles of railroad near Jackson, Tennessee, while Van Dorn captured the base at Holly Springs. By hard marching on half rations Grant's army escaped to Memphis, but the campaign by this route was defeated.

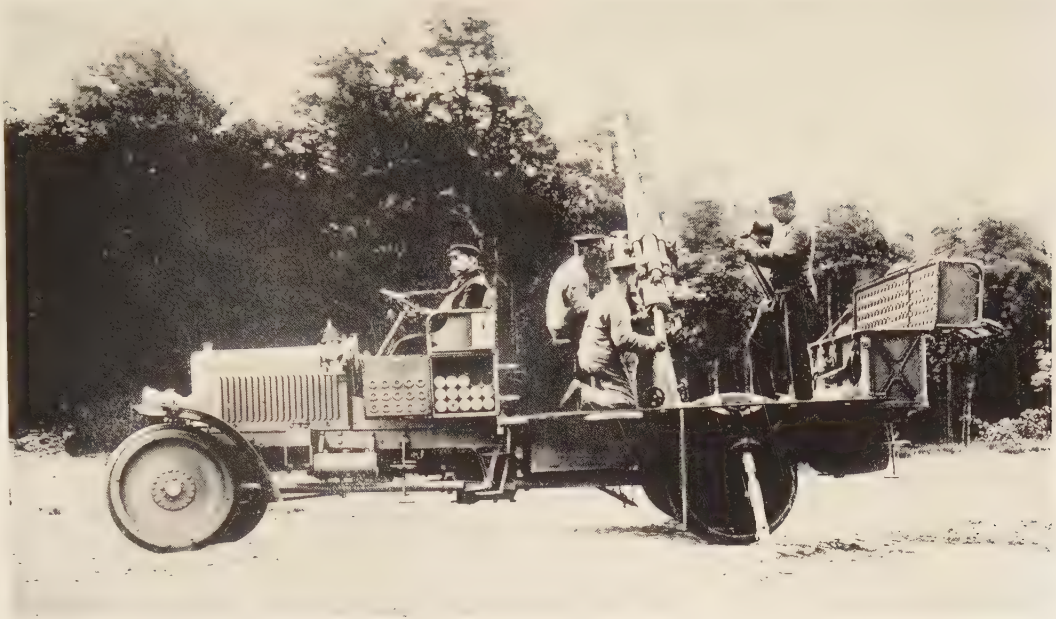
Rail communication must likewise be thoroughly protected from interruption in order to permit a vigorous prosecution of the campaign at the front. In the campaign of Sherman from Chattanooga to Atlanta in 1864, he reached the latter city with 82,000 men. The guarding of the

long line of rail back through Chattanooga to Nashville had caused the detachment of 115,000 men.

All of this preparation and organization is to the end of supplying daily bread and meat to the soldier at the front, the man who does the fighting. He is already loaded with a nine pound rifle, 150 rounds of ammunition, with blanket, rain cape, haversack, mess kit, and an extra pair of shoes. His total pack runs from fifty to sixty pounds in the various countries. Hence by furnishing rations daily this addition to his load is kept small.

However, prudence dictates that he shall have a certain provision in case of a failure to receive rations when due, and this is provided by requiring every man to carry, in addition to the day's subsistence, a second full ration, and one or more emergency rations. These last are compressed cakes of chocolate, biscuit, and dried meat. A cake the size of a man's hand furnishes nourishment for a day if divided into three morsels, but it is far from satisfying.

The staple items of the ration must necessarily be such that they will stand heat and storage without serious loss in nutriment or flavor. In all nations these consist of about 13 oz. salt meat, 26



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High-angle gun for attacking air-craft. Note the range-finder and ammunition chests

oz. of hard bread and 7 oz. of rice or peas, with small portions of sugar, salt, and coffee. Every effort is made to supplement the diet by fresh meat and vegetables, levied or purchased in the immediate vicinity of the troops. This living off the country is carried much further in Europe than it is in the British or American practise. The collection of all available supplies in the district occupied is especially the duty of the supply officer of every division. The forwarding of the necessary additional items from the depots is a routine matter in which he is only an agent. He is immediately responsible for the full utilization of the resources of his district.

The importance of this method of subsistence is twofold. It varies and improves the diet of the men, and still more important, it relieves the line of communications of the transportation of supplies to a large extent. It is rare that complete subsistence can be obtained by this means and then only for a limited time. The deficiencies must in every case be made up by supplies forwarded from the depots.

Two methods of utilization of local resources are used. One is to estimate the stock of food in the district and then to levy all that can be

taken without immediate privation for the residents. Since the cities will have a smaller proportion of food than country districts, their deficiency is made up by cash levies. In home territory or a friendly country the supplies are paid for at once; in a hostile district they may be taken without payment.

The other method, always used in Europe as far as possible, is to billet the troops upon the householders. Every householder is assumed to be able to feed and shelter a number of soldiers equal to that of his family for a five day period. Thereafter the billeting is continued for shelter, but rations are furnished by the military supply service. This system also saves the supply service the burden of providing and carrying large stores of tentage. In the home country the payment for billeting is so liberal that it is sought for during maneuvers by the housewives as a money-making proposition.

When billeting cannot be carried out the companies mess as units whenever possible. The meat and vegetable components are put in together and are made into a stew in the big boilers and fireless cookers with which each company is provided. The fireless cookers, built into carts,

are loaded up in the morning, and at the noon halt have a supply of hot coffee and soup ready to supplement the bread that the men have carried in their haversacks. It is even attempted to provide fresh bread at intervals as a relief to the monotonous diet of hardtack. Field bakeries are provided, one for each division, which catch up with the armies for every prolonged halt, and start a regular bread service.

So enormous is this task of supplying armies in the field that unless every detail is carefully provided for, the operations of the armies may be seriously embarrassed. It can be handled only by spreading out the responsibility, by decentralization. This is accomplished by making each army corps independent in its service.

The chief supply officer, on the staff of the corps commander, has entire charge of the advanced base for his corps and of the automobile and wagon transport for forwarding supplies from the advanced base to the front. He sends into the nearest general depot timely requisitions in order to maintain in the advanced base a ten-day supply of all classes of supplies. The railroad service or communication service is then responsible for delivering the stores in bulk, by the train load, to

the commander of the advanced base. The organization there divides up the items and makes up the shipments to the divisions and regiments.

While the ration service is more emphasized above as being the largest problem, the supply of ammunition, clothing and forage is carried out in a similar way and by the same organization.

Ammunition is forwarded from the advanced base only when combat has made necessary the replenishing of the stock at the front. The columns for the service are made up of the caissons used with the field artillery so that the individual caissons can take their places in batteries to replace those whose supply has been used up. Similar caissons are provided to haul the rifle cartridges to the infantry, but ordinary vehicles can be used if necessary.

Hay is enormously bulky; consequently the continental armies attempt to furnish only grain for the animals. These are expected to pick up enough "roughness" to balance their feed. On rapid raids or forced marches the conditions are especially hard on the horses. To exhaustion is added insufficient feeding; the consequent wastage of animals amounts to large figures.

The issues of clothing form an item whose im-

portance is easily overlooked. Conditions of campaign use up clothes fast; every three months the soldier will need a complete new outfit. Shoes seem almost to melt away in the marching in dew and mud. Any Civil War veteran can tell tales of the "fadeaways" of the issues of that period. The life of the best shoes is about thirty days.

To these difficulties further complications are added by winter. Modern wars require that fighting shall go on irrespective of the weather, so extra precautions must be taken to mitigate the hardships of the season. Heavy overcoats, mits, hoods, and foot wrappings must be furnished in abundance. The service is enough to sorely tax the resources of the state.

Since every wagon, truck, and gun carriage must have a driver, since the railroads and military arsenals must be manned, working force must be provided, and guards everywhere, it is readily seen that the supply service uses up a large part of the enrolled military strength of the state. This total service, called the service of the rear, easily uses up twenty per cent. of the men called into service. However, the older men are used for these duties, so that the pick of the fighting strength of the state stays with the fighting line.

CHAPTER VIII

PRINCIPLES OF STRATEGY

War may generally be classified as offensive or defensive. Defensive warfare frequently changes to offensive operations when opportunity offers, for nothing but negative results may be expected from strictly defensive action. A nation may not wish war, but having war forced upon it, may, as the best method of defending its integrity, assume the offensive, carry the war into the enemy's country, and compel a peace upon its own terms. The terms offensive warfare and defensive warfare are used for convenience, and are generally descriptive of the character of the causes of the war. It must not be assumed, however, that in an offensive war the government which provoked the war is continually the attacker and that the opponent is continually on the defensive.

The causes and nature of the war determine necessarily which party in the first instance at least must seek the offensive. In the Spanish-American War, for example, the United States

demanded of Spain the removal of its military forces from the Island of Cuba. When Spain refused this demand and the United States declared war, the mission which our government imposed upon itself determined the nature of the military operations to be undertaken by it. To forcibly oust the Spanish army from Cuba, required offensive warfare. There are occasions, however, where both governments assume the offensive at the outbreak of war, both strategically and tactically. This is usually the case where the contending governments have both prepared for a war believed to be inevitable, where they are contiguous states, and where the war is the result of racial or commercial differences or strivings. At the outbreak of the present war in Europe both Germany and France assumed the strategical and tactical offensive, Germany attacking through Belgium, and France through Alsace and Lorraine. This might be termed the double offensive, and is based on the knowledge that affirmative results can only be looked for by offensive action and by the ability to contain the theater of active military operations within the enemy's territory. The main opposing armies may meet in the same theater head on, or they may as in the instance

cited, strike in separate theaters. Where the opposing armies meet head on, the result of the earlier battles will determine which is compelled to resort to the defensive. When they are operating in different theaters it is obvious that the results in one theater will quickly and vitally affect the operations in the other. Much depends upon celerity and early results. The aggressor who in his own theater first wins success, and follows it up with all the means at hand, will usually find that the enemy's offensive campaign in the other theater is stopped in order to move troops therefrom to stay the retreat in the other theater. To prevent this, the successful party usually causes the troops acting on the defensive in the theater where the enemy attacked, to in turn attack the enemy and make every effort to assume the offensive. This action while frequently causing inferior forces to attempt the offensive against greatly superior forces, is often justified when the result prevents the enemy from moving large forces to the rescue of their army being driven back in the other theater.

All the general officers of experience in war, and all the writers on the subject of war, make mention of the great value to an army of early success

in war. Initial success raises the morale of the army, increases the fighting spirit of the men and stimulates the organizations which did not participate to seek opportunity to share in the glory of victory. Initial defeat on the other hand usually lowers the morale of the army, lessens the keenness for combat and tends psychologically to invite organizations to assume the tactical defensive.

As we have the strategic offensive and the strategic defensive, and the tactical offensive and the tactical defensive, so we may have combinations of these wherein an army operating on the strategic defensive may adopt temporarily the tactical defensive and conversely an army on the strategic defensive may adopt the tactical offensive. An example of the strategic and tactical defensive is presented by Lee's defense of Richmond in the Wilderness campaign. Grant's rôle in that campaign illustrates the strategic and tactical offensive. He was the invader and the attacker. When in 1863 Lee began the campaign which carried the war into Maryland and Pennsylvania and terminated in the Battle of Gettysburg, he dropped the strategic defensive and adopted the strategic offensive. At Gettysburg by attacking the Union Army he assumed the tactical offensive.

If, however, he had awaited an attack by Meade, as some military writers claim he should have done, his action would have illustrated the strategic offensive and the tactical defensive. An example of the strategic defensive and the tactical offensive is seen in Early's defense of the Shenandoah Valley in 1864. Charged with the defense of the Valley he saw an opportunity to attack Sheridan's army and at Cedar Creek in October, 1864, assumed the tactical offensive.

The combination of strategic and tactical defensive offers no practical and enduring results in war and non-success means the destruction of the army and loss of territory. The combination of the strategic and tactical offensive offers the destruction of the enemy and the occupation of his territory, while defeat means only the temporary abandonment of the campaign. The other combinations are frequently desirable by reason of special circumstances and as temporary expedients before reassuming the strategic and tactical offensive. The determination of the strategic rôle to be assumed is largely dependent upon politics and but little upon the will of the commander, for as has been pointed out, strategy is but a continuation of politics. Where the war is a result

of the political offensive, the strategic offensive follows to carry out the national policy. Where the political policy is defensive, the strategic rôle is usually though not necessarily defensive.

Strategy prior to the Napoleonic era was largely concerned with maneuvering, not always for the purpose of forcing the issue by battle, but to occupy ground and to assume positions believed to have important bearing on the objects of the war. The campaigns of Bonaparte, however, from his activities in Northern Italy as a young general of twenty-eight, exemplify a strategy which sought results by battle. Bonaparte maneuvered for the purpose of deceiving the enemy and to lead him to dispose his forces so that he might crush them in detail. But always the maneuver led to the crushing issue of battle. This has been the guiding principle of strategy since the time of Napoleon. His rapid marches, powerful strokes, and daring maneuvers, have been subjects of admiration for a hundred years, but in the early days of the Napoleonic era, military sentiment was not by any means unanimous in approving the efficacy of Napoleon's methods. One German writer of that time advocated that one ought to avoid battles and should have recourse to maneuvering; that to be

obliged to fight a battle indicates that a mistake must have been committed previously; and that every victory can be neutralized by operating strategically against the flanks and rear of the enemy.

No consideration of the subject of Strategy would be complete without reference to Jomini.[1] This French officer, at twenty-six years of age, a major on the staff of Marshal Ney, published in Paris in 1805 his treatise on military operations. This work made a great impression on Napoleon who is reported to have said after the battle of Austerlitz, "People say that times are not progressing; here is a young battalion commander, and of all men a Swiss, who tells us things which my professors never told me and which few generals understand. This is giving away to the enemy my whole system of war." Jomini discarded the system of conducting war by maneuvering for position and advocated what Napoleon practised, viz., the use of force with the utmost determination. He advocated the offensive whenever practicable, pointing out that the offensive, if successful, permitted the victor permanently to retain the initiative, thereby compelling the enemy

[1] "Traite des grandes opérations militaires," Jomini.

to conform his movements to those of the victor. The object of the offensive was the annihilation in battle of the opposing army and the relentless pursuit of escaping columns.

In the domain of strategy the Prussian General von Clausewitz is usually regarded as Germany's greatest military theorist and philosopher. He was present as a young Prussian officer at the battle of Jena, and later he was for a time in the Russian army and served on the Russian General Staff. While a Russian officer he had considerable experience in campaigns. He combined with his experience in war a thorough grasp of military history. His work on war was not published until after his death. Clausewitz has been called the real schoolmaster of the Prussian army. He advocated aggressiveness in battle as the means to attain the object of war. He said, "Let us not hear of generals who conquer without bloodshed. If a bloody slaughter is a horrible sight, then that is ground for paying more respect to war, but not for making the swords we wear blunter and blunter by degrees, from feelings of humanity, until some one steps in with one that is sharp and lops off the arm from our body."[2]

[2] "On War," Book IV, chapter 11.

In connection with the present war in Europe, it is interesting to note that this Prussian author Clausewitz stated, "The defensive is the stronger form with a negative object; the attack is the weaker form with the positive object." This doctrine has, since the time it was written, been continually criticized by many German writers. One German authority says, "The resolution to act on the defensive is the first step to irresolution."[3] General von der Goltz who at the present writing, October, 1914, is German Military Governor of Belgium, in his work, "The Nation in Arms," says, "The idea of the greater strength of the defensive is, in spite of all, only a delusion." And he later adds, "And to make war, means attacking."[4] Even more interesting in its connection with the present war in Europe is the contrary view expressed by the German General von Camerrer in his work on the "Development of Strategical Science" which in a way seems to have been prophetic. It appeared in 1904. He says, "If at some future occasion our German Empire may have to fight for life in several directions, like Prussia in the Seven Years'

[3] "Chief System of Leading Troops," Merkel, page 35.
[4] "The Nation in Arms"—Von der Goltz.

War, we can surely not do without confidence in the power of defense; and it would be very regrettable if in large circles the feeling prevailed that irresolution was now beginning and that our cause was already half lost." In the present conflict in Europe the position of Germany resembles very much the situation here outlined as justification for the adoption, temporarily at least, of the strategic defensive; but the adoption of the defensive may be likened to the parrying movements of the pugilist—they are sometimes necessary as a preparation for the counter-stroke. The counter-stroke might rightfully be considered as an integral part of defensive operations, and all the accepted authorities on strategy advocate the swift and vigorous assumption of the offensive at the right moment.

The Nineteenth Century saw material changes in the conduct of war. These resulted from the extended use of railways in civilized countries, the improvement of public highways, the introduction of telegraphy and of the telephone, and the increased range and power of fire arms, particularly of field artillery cannon. Roads and railroads not only directly affect the rapidity with which troops may be concentrated, but indirectly

they make possible the utilization of vast numbers by providing means for their supply. With the increase in the number and capacity of locomotives and cars, the ability to transport in a given time a stated number of tons of supplies has been greatly increased, and so to-day we find actively engaged on the continent of Europe almost with uninterrupted fighting, vast numbers of men, which prior to the advent of the modern railway systems, it would have been impossible to maintain.

Military history furnishes examples of a realization on the part of those charged with the conduct of a war, of correct principles to be applied in the solution of a given problem, but a failure to adopt and apply such principles because of irresolution on the part of the leader, or his unwillingness to shoulder the responsibility of the sacrifices to be incurred in carrying out the operations dictated by such principles.

Boldness of leadership and perseverance of officers and men are as much a part of applied strategy as are the abstract principles of strategy. Every great general has been the possessor of this quality of boldness. Not always is this quality dressed in dramatic habiliments. Sometimes

it is cloaked by an exterior of quietness and taciturnity. But nevertheless among the qualities possessed by the great military leader will always be found the essential one of boldness. In our own history we have only to reflect on the crossing of the Delaware by Washington in the dead of winter, and his bold and successful attack upon the Hessians at Trenton. The great Confederate General, Lee, well exemplifies the quiet and apparently conservative type of leader whose operations were nevertheless characterized at times by boldness to the extreme. Under given conditions he did not hesitate to violate accepted principles of strategy to accomplish an end which his boldness led him to believe could be attained with reasonable safety under the particular circumstances affecting the situation at the time. At Chancellorsville in the face of the enemy, he detached a large part of his army under Jackson. Jackson's Corps made a long flank march and falling unexpectedly on the right wing of the Union Army, crumbled it up and threw it back in such disorder that the Union General Hooker felt his offensive powers paralyzed, and the battle of Chancellorsville was lost to him.

If the people of a nation, through the means

obtained from successful commerce, indulge themselves in the enjoyments of comforts to such an extent that what might be termed effeminacy of feeling results, there will follow a degeneracy of those qualities of boldness and perseverance under stress so essential in war. These qualities are in a manner the tools with which strategy must work, and might even be considered parts of the machine itself.

The great military teachers have recognized these qualities in the application of strategy, and as a part of their strategy have sought to develop them among their people. In no country has this effort been so consistently made as in Germany, and in that country, as exemplified by the present war, there exists among the people an intense willingness to accept any burdens and to make any sacrifices for the furtherance of their cause. The German people interpret the black, red and white of their national colors by the saying—"*Durch Nacht und Blut zur Licht*"—(Through night and blood, to light). This maxim is largely the actuating principle of German military teachings since the Napoleonic era. All the writings of the German military authors breathe this spirit.

The English writer Colonel F. N. Maude, as far

back as 1911, referring to the German view of strategy and of war, stated: "It reveals 'War' stripped of all its accessories, as the exercise of force for the attainment of a political object unrestrained by any law, save that of expediency, and this gives the key to the interpretation of German political aims, past, present and future, which is unconditionally necessary for every student of the modern conditions of Europe."

CHAPTER IX

THE STRATEGIC OFFENSIVE

As the strategic offensive necessarily carries the armies of the aggressor into the territory of the enemy, it relieves the government and territory of the aggressor of the embarrassments and distress which accompany the active operations of an army, and visits these hardships upon the enemy. This leaves not only the resources of the home country free to be drawn upon for the prosecution of the war, but makes available for the same purpose the territory of the enemy as fast as it comes into possession of the invader. The strategic offensive enables the aggressor to make and follow his own plan, so long as he is successful. The defender must shape his plan to meet that of the aggressor, and he must therefore be prepared in every theater of possible operations, and cannot commit himself until he knows or believes he knows the invader's plan. This tends to indecision and vacillation on the part of the defender, while the preparations and operations of the ag-

gressor are characterized by eagerness, activity and certainty.

When the strategic offensive is the best means of national defense, it should be adopted without hesitation. There is no better method of defending one's person from the threatened assault of a highwayman, than a sudden blow which anticipates his. This measure, often successful, illustrates what is sometimes termed the offensive-defensive.

When the Boer War became inevitable, the late President Kruger did not await the coercive measures of Great Britain. He immediately assumed the offensive as the best method strategically, of preserving the integrity of his own country. Commenting on this action the German General von der Goltz said: "The statesman who, knowing his instrument to be ready and seeing war inevitable, hesitates to strike first, is guilty of a crime against his country."

The strategic offensive enables the assailant to select the point of attack and by massing his troops and striking at the point selected, he is enabled not only to effect possible surprise, but to have greatly superior numbers at the point of contact.

There are certain disadvantages, however, inherent to the strategic offensive. In the first place the more successful are the offensive operations, the further is the army ordinarily carried from its base of operations. The large forces which make up the modern army cannot find sufficient supplies and forage in captured territory to make the army self-supporting. In any event the retiring enemy would remove or destroy anything which might be of aid and benefit to the enemy. It is therefore essential for an army, particularly one operating on the offensive, to have a continuous stream of supplies, ammunition, and subsistence and forage flowing from some source in the home country to the organizations in the field. The line over which these supplies are forwarded is called the "Line of Communications." The line of communications is therefore an artery extending from the base out to the army in the field. Under modern conditions a railroad line is almost an essential part of a line of communications. The cutting or interruption by the enemy of the line of communications, might result in a suspension of offensive operations at the front. The destruction of the line of communications might result in the capture or destruc-

tion of the forces at the front. The line of communications must therefore be protected by troops assigned for that purpose. These troops include all arms. They must be available in sufficient numbers, not only to resist strong raids, but to guard every trestle, bridge, tunnel, yard, switch and mile of track against depredation by individuals. With a short line of communications within the army's home territory, this problem is not a serious one and does not involve the assignment of many troops for the protection of the line. But as the army advances into the enemy's territory, in furtherance of the strategic offensive, the line of communications necessarily lengthens and its protection requires additional troops. As it enters hostile territory, the dangers become greater and more numerous and a greater percentage of troops per mile of line are necessarily employed.

The employment of troops for the protection of the line of communications is as important and necessary as the work performed by the troops at the front. Yet the effective fighting force at the front are the troops with which the battles are fought. In the conduct of the strategic offensive, the numerical ratio which the line of communica-

tions troops bears to the total numbers constituting the army, increases steadily as the offensive operations carry the army into the enemy's territory, until finally the troops in rear may exceed in numbers, the troops at the front. An example of this is furnished by Napoleon's Russian Campaign. In 1812 he crossed the Niemen River with 440,000 men. In his advance to Moscow it was necessary for him, operating as he was in a hostile country, to fully protect his line of communications, and intermediate supply depots. When he arrived as Moscow he therefore had actually with him but 95,000 of the 440,000 with which he started. Another example of the disadvantages of the strategic offensive when the operations carry the army far from the home base, is furnished by Massena's Campaign in Spain in 1810. Marshal Massena crossed the Pyrenees Mountains with 400,000 men. His advance towards Lisbon was marked by continued successes, but owing to the length of his line of communications he arrived there with less than 50,000 men, a force which he found insufficient to deliver a crushing blow to the enemy. He could not well remain after the battle of Torres Vedras and so he was forced to retreat without attaining the object of the cam-

paign. General Sherman at Atlanta had under him nearly 200,000 men present for duty, and yet the total number available for the actual march to the sea approximated but 80,000 men. He considered this force insufficient to make the advance, and at the same time to maintain a line of communications. He therefore abandoned his communications, and succeeded in living on the country in his march from Atlanta to Savannah. At the latter place he established a new base.

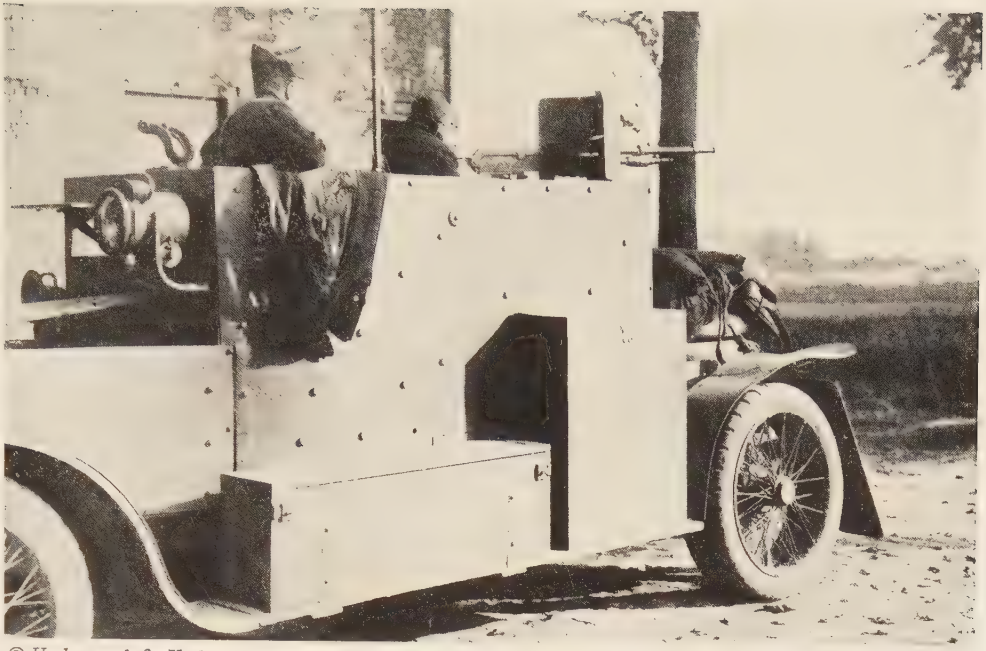
Another disadvantage of the strategic offensive usually mentioned by the authorities is the fact that knowledge of the topographical features of the enemy's territory are not as well known to the assailants, as are those of the home country. Reliance is necessarily had on incorrect maps, reports of patrols and unfriendly inhabitants. This comment is particularly exemplified by the experience of the Union Armies in the Civil War, and by the operations of European armies in the Far East and in Africa.

In recent years, however, the importance of this objection to the strategic offensive has been greatly lessened because of the full and complete information gathered by the military authorities of the leading governments, of all the facts af-

fecting possible theaters of operations. This information includes the preparation of accurate maps.

Natural obstacles, such as wide rivers or mountain ranges crossing the path of the army are disadvantages, in the pursuit of the strategic offensive. The crossing of a formidable stream on improvised bridges or of a mountain range through a narrow pass or defile is not only a difficult operation in itself, but in the event of the defeat of the army after a successful passage or crossing, such obstacle becomes a serious menace to the integrity of the forces. There are many examples furnished by military history of the destruction of an army fighting with a river or mountain range at its back. These features of the *terrain* may be likened to the exit of a public hall, which, ample for the egress of persons under normal conditions, becomes a death trap under abnormal conditions. This was the fate suffered by the Russian Army at Friedland in 1807.

The power of the strategic offensive has been referred to as a waning power, and unless the nation assuming the strategic offensive has made preparation to continually strengthen the fighting front by sending in a steady stream of re-



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Armored motor-car equipped with a rapid-fire gun used for scouting by the Belgian Army

serves the adoption of the strategic offensive though successful in the first instance, may result in ultimate disaster. It is essential that the government conducting strategic offensive operations should recognize the culmination of their offensive power. If the defeat of the enemy and the object of the campaign have not been attained with the culmination of power, prudence requires that peace be concluded on the most favorable terms, or that the offensive be abandoned and the strategic defensive resorted to.

By the adoption of the strategic defensive is not meant military passivity. This has been pointed out in Chapter VIII. The adoption of the strategic defensive does not therefore preclude offensive tactics. And it may develop as a result of offensive tactics that the strategic defensive is so well maintained and the power of the enemy so adversely affected that the rôle of the strategic defensive may be dropped and that of the strategic offensive employed. It is too early to attempt a study of the military operations now being carried on in Europe, because our information is not authentic, but nevertheless it is apparent that in opposing the advance of the German armies into France by way of Belgium, the

allied forces which constituted the left wing of the allied army adopted the strategic defensive, and though constantly fighting, continued to retire before the German advance until their retrograde movement carried them to the line of the Marne. Here a defensive action of great severity was maintained for a period of several days, at the conclusion of which it would appear that the allies assumed the tactical offensive. This action on their part was followed by the German right wing opposed to them, dropping the strategic offensive and adopting the strategic and tactical defensive. Whether this change in their strategy was the result of punishment inflicted on them when the allies adopted the tactical offensive on the line of the Marne or whether it was made necessary by the presence of other allied forces in their right rear, which required a bending back of their right wing in order to protect their line of communication and the right flank of the army, is not certain at this time. The operations, however, so fresh in the minds of all, serve to illustrate the application of the principle mentioned.

In order to conduct the strategic offensive, it is necessary, when actual contact is about to be made, to so maneuver the available forces as to

effect concentration. But concentration increases the difficulties of maintaining an army, and endangers health. Concentration furthermore is apt to notify the enemy of the location of the forces and thus may furnish him the opportunity to glean the plan of operations. All the considerations therefore which affect the health and comfort of the troops, the supply of organizations and the necessity for deceiving the enemy dictate a reasonable dispersion of forces, while the necessities for the aggressive prosecution of the offensive, require that they shall be concentrated. The German author von Scherff [1] on this subject, recommends that a commander should "keep all the forces as much as possible collected, and only to consent to a separation when such is absolutely necessitated by considerations of supply and by the requirements of detached duties, or when there is a guarantee that by this division of forces the enemy can readily be deceived. Only an actual and considerable numerical superiority should allow us, without disadvantage, the luxury of separation."

In the prosecution of the strategic offensive, surprise is one of the most effective methods em-

[1] "About the Conduct of War," von Scherff, pages 330 and 632.

ployed. By surprise is not only meant such maneuvering of forces as will enable the aggressor to launch an attack in the nature of a surprise, but those measures generally, which because they are uncontemplated by the enemy, embarrass him and force the adoption by him of hastily considered dispositions to oppose their effectiveness. Generally it may be said that the effectiveness of surprise depends upon secrecy and rapidity. The older authorities on strategy discount to some extent the value of surprise as a strategic principle. All agree on its value tactically. This distinction is based on the great difference existing between the magnitude of the movements and details involved in strategic surprise and in tactical surprise. In the tactical surprise the troops may march and actually deliver their attack within a reasonably short period after the adoption of the plan; while in the strategic surprise, where armies and subdivisions are to be moved, much time might necessarily be consumed in providing not only for the movement of large forces but for the extension of lines of communication and the establishment of new supply depots for the maintenance of such forces.

Modern conditions, however, have materially

changed the value of this distinction, for the network of railroads which now cover the territory of most civilized nations and the amount of rolling stock available, make possible the rapid transportation of vast numbers of men and animals, with all necessary supplies, from point to point as the necessities of the strategic plan for surprise may dictate.

While the principles of offensive strategy are to a certain extent fixed, each great war produces a new exponent of their practical application. It will be found that the successful leaders, while they have been students of the past, have not hesitated in their application of the principles of strategy, to avail themselves of the modern methods and facilities of their time. In time of peace the military system of a government is apt to suffer from what might be termed military arterio-sclerosis or hardening of the military arteries. A military system, if not carefully watched and kept youthful, strong, and up-to-date, may become actually fossilized by the refusal of those in authority to discard the methods sufficient and proper in the time of their youth for the more modern methods contemporaneous with their advanced years, but of which perhaps they have not

intimate acquaintance. And so we find throughout history that venerable and respected military structures, solidly founded on worthy performance in past wars, loyally supported by a grateful people, and receiving the respect due to age, have sometimes fallen with a crash under the weight of the more modern conditions of a new war.

In the United States the advent of the Spanish War in 1898 played havoc with the military system of the country. It is told of one venerable departmental officer that shortly after the outbreak of war he grieved considerably over the condition of his department, stating that for years he had gradually built up and had finally perfected a great system, when along came the war to interfere with his work and bring down the system like a house of cards. If we could all profit by the teachings of history and each generation avoid the repetition of incorrect methods clearly established as such by the experience of the past, the world would to-day be much further advanced in all lines of activity.

CHAPTER X

THE STRATEGIC DEFENSIVE

The advantages of the strategic defensive are many, so far as military operations are concerned, but as pointed out, none but negative results may be looked for, unless at an opportune moment, the defensive rôle is dropped and the *tactical* offensive at least, assumed. The commander operating on the strategic defensive has the advantage of operating in his own country. He has many friendly sources open to him for obtaining reliable information concerning movements of the enemy. He frequently has heavily fortified supporting points to stiffen his defensive line. He has an accurate and intimate knowledge of the ground. He can select his position where he will resist further advance of the enemy, and in the preparation of that position he usually has available second line troops and large numbers of civilian employees. His task is much less formidable than is the task of the opposing commander, for while the latter must seek out and destroy the defender,

the defender has only to successfully resist his opponent in order to be successful. Where the defender is obviously weaker than the assailant, he may offer resistance up to a point consistent with safe retirement and make another stand. This policy if repeated successfully, requires the assailant to attack and suffer the high losses which are incidental to the strategic and the tactical offensive, while the defender may retire from each engagement with a much lower percentage of loss. While the defender is retiring he, unlike the assailant, is shortening his line of communications. His problems of maintenance and supply, unless the country has been exhausted with continuous warfare, are simple problems, and his line of communications is generally readily protected.

The strategic defensive is the conservative plan of operations. In the adoption of the strategic offensive, military commanders are sometimes forced to adopt a radical and ill-considered plan, based on public demand. Examples of this are furnished by the insistent demands of the northern press at the outbreak of the Civil War that the Union Army move immediately on Richmond. The adoption of the strategic offensive for the purpose of complying with this demand, resulted

in the disaster of Bull Run. The strategic defensive avoids such pitfalls and leaves the way open for a prompt change to the tactical offensive if the assailant, in his offensive policy, adopts a radical and faulty plan.

In the present war in Europe, while the strategic offensive was adopted by the right wing of the French Army, when it invaded Alsace and Lorraine, the strategic defensive was adopted by the left wing which conducted a series of defensive engagements while falling back toward Paris, before the advance of the German armies through Belgium and Luxemburg. It must be apparent that due to constant infliction of losses on the German forces, the intense and unrelenting physical and mental strain inseparable from their rapid marching and continuous fighting and the elongation of their line of communications, their offensive power waned as they advanced. On the other hand the strategic defensive policy adopted by General Joffre, while it hurt French public pride, enabled the French authorities to bring up their reserve forces and make possible the cooperation and actual participation in the campaign of their British Allies. Therefore it transpired that as the German power waned with its advance, the

power of the Allies was increased as they retired. The allied forces were therefore enabled, along the line of the Marne, to fight in a manner and under conditions, which they could not have done, and which did not obtain along the line of first contact.

The strategic defensive is frequently adopted as a temporary policy until conditions favor the adoption of the strategic or the tactical offensive. Under the principle that positive results can only be obtained through the medium of the strategic and the tactical offensive, the latter policy should be resorted to when the conditions justify that course. This principle is well illustrated by the actions of the Allies in the present war in Europe. After the engagements along the line of the Marne, the conditions which affected the Allies and the Germans, at the opening of the campaign had so changed that when the German right wing adopted the strategic defensive, the Allies changed from the strategic defensive and adopted the strategic and the tactical offensive, and followed the Germans aggressively.

Rivers and mountain ranges play an important part in the success of defensive operations. As an enemy's army is normally and properly the

objective of an invading force, it is desirable that the defender so maneuver as to place in the line of the assailants' advance, physical obstacles of that character. General Lee constantly availed himself of rivers in the strategic defense of Richmond. The seriousness of a river obstacle is indicated by the defeat of the Union Army of over 100,000 men, under Burnside, at Fredericksburg. Burnside did succeed in crossing the Rappahannock River, but Lee's Army fully intrenched was there to oppose him, and although the defenders numbered but 60,000 men they successfully repelled the Union assaults. When General Buller of the British Army undertook to relieve the British forces besieged in Ladysmith his route required him to cross the Tugela River. The attempted crossing resulted in a severe check to the British arms. Mountain ranges offer favorable means for defensive measures, particularly if they are rough and can be crossed by large forces only through one or two passes. Usually, the tactical defense of a mountain range is made on the side away from the enemy. This enables the defenders to strike the attacking columns while they are emerging from the defiles or passes and offers opportunity to defeat them in detail.

In the last analysis the objection to the strategic defensive is that it can never accomplish positive results. At best, it can only avoid defeat.

There are many methods of maneuvering troops in large forces based on the desire to avoid the losses entailed by frontal attacks. Some of the more common forms of strategic maneuver, having this object in view, will now be considered. The first of these is diversion.

In any consideration of military operations in war, it is well to keep in mind that the greatest difficulty experienced by the commander is the problem of discarding incorrect information, recognizing authentic information and of analyzing and properly appraising the latter. An army in campaign works in an atmosphere of ominous rumor, doubt, and alternating cheerful optimism and discouraging pessimism. It is therefore frequently difficult for a commander to correctly sense the true meaning of some operation of the enemy. This makes what is known as diversion, an important feature of strategy, and one frequently employed in the strategic defensive. Diversion cannot be better illustrated than by reference to Jackson's campaign in the Shenandoah Valley.

While McClellan was engaged in the campaign against Richmond in the Spring of 1862, he was promised the cooperation of General McDowell's corps which had been detached from the Army of the Potomac in order to cover Washington, and which was concentrated in the vicinity of Manassas. This force numbered about 30,000 men. The Union General Banks had a strong division in the vicinity of Harrisonburg. Other Union forces under Generals Fremont and Shields were also operating in Northern Virginia. Jackson by rapid marching successively defeated these forces, and created such a diversion that President Lincoln telegraphed General McClellan on May 26, 1862, "In consequence of General Banks' critical position, I have been compelled to suspend General McDowell's movements to join you."

In 1864 when Grant was before Richmond and the Confederate Army was again hard pressed, Lee sent Early's Corps, although they were greatly needed in the intrenched lines at Cold Harbor, into the Shenandoah Valley to make a demonstration against Washington. General Early succeeded in marching down the Shenandoah Valley, crossed the Potomac and advanced on Washington. He was not strong enough to

break through the defenses of Washington, but the diversion had the effect of alarming the North, and of causing two full corps to be sent to Washington as reenforcements. Later to prevent similar diversions, and to enable the Union Army to take the offensive in the Shenandoah Valley, the Army of the Shenandoah under General Sheridan was organized. One of the corps sent to oppose Early was from Grant's army, where its presence was needed, and the other was diverted while on its way from New Orleans to join Grant before Richmond.

Strategic penetration is the name given operations which seek to pierce the enemy's line of defense for the purpose of cutting it in two and defeating the parts in succession. When penetration is successful the effect is sure to drive apart the wings of the opposing army and force one or both of them to retire in a lateral direction. Strategic penetration involves the tactical offensive at the point selected to be penetrated. It means the launching of overwhelming forces against that point, and the determination and ability to drive through with large forces of following troops. If the wedge is not strong enough for the work, it may not penetrate, but on the

contrary it may be subjected to severe losses, amounting almost to annihilation. If successful, however, it enables relatively small forces of the attacker to hold or contain one wing of the enemy's army, while the attacker with all the remaining available forces envelops or rolls up the remaining wing.

An example of what may be accomplished by strategic penetration is furnished by Napoleon's campaign of 1796 against the Austrians and Piedmontese. In April of that year Napoleon was on the Riviera at Savona. He had 36,000 men. Opposite his right there were 30,000 Austrians between Sassello and Voltri, based on Milan. Opposite his left were 22,000 Piedmontese at Ceva, based on Turin on the northwest. Napoleon determined to advance with his united forces against the point where the lines of the opposing armies met. When he advanced, the Austrian right advanced to meet him, and on the 11th and 12th of April he defeated them severely in the battle of Montenotte, driving them back on Dego. On the 14th he captured the latter place, the Austrians retiring to Acqui while the Piedmontese remained at Ceva. Napoleon therefore had succeeded in placing his army between the allies op-

posed to him. The allies were not only separated but were on divergent lines of retreat. The distance from Acqui to Ceva by the best available roads then in use was sixty-seven miles. Napoleon having defeated the Austrians, as stated, lost no time, but turned his victorious troops against the Piedmontese and then again followed up his advantage against the Austrians.

Under a consideration of the strategic defensive should be included the subject of retreat after a lost battle. It is a military axiom that after the loss of a battle, a second battle must be avoided until there is a change in the circumstances of the vanquished. This change of circumstances may be due to reenforcements received by the vanquished or by a diversion created by cooperating forces which has been effective in its influence on the operations of the enemy. The retreat is normally continued until such change of circumstances enables the army to make a stand with some reasonable probability of success. Not always, however, is the retreating army enabled to conduct its retreat in such manner as to occupy and attempt to hold ground previously selected for that purpose. The pursuit of the enemy may be so swift and unrelenting that disorganization

and panic enter the ranks of the vanquished, and the retreat develops into a rout. History shows, however, that a vanquished army is frequently enabled to so delay, hinder and harass the pursuit of the victor by the intervention of an efficient and determined rear guard, that the main body is enabled to make another stand on ground but a short distance from that which saw their defeat. The greatest damage which the vanquished ordinarily suffers, is not the loss of men, animals or property so much as it is the loss of morale—the intermixing of organizations, the straggling, skulking, loss of confidence, and the difficulty of communicating orders and controlling the various activities essential in the coordination of military forces. The first part of every retreat is therefore devoted to correcting these shortcomings while the enemy is sought to be held at bay by the rear guard. When order has been reestablished and coordination effected, the counter stroke is frequently resorted to to compel the pursuer to stay the pursuit.

In conducting the retreat after a lost battle some authorities advocate a division of forces and a retreat of the subdivisions eccentrically. This plan is justified by them on the theory that it will

compel division of the pursuing forces if they are to follow both subdivisions; while if they do not divide, opportunity is afforded one of the vanquished subdivisions to attack the pursuer in flank. After the battle of Brienne on January 30, 1814, Napoleon divided his forces, sending Marmont back to the Aube, while he himself turned toward Troyes. The Allies, who were pursuing, missed their opportunity for they divided their forces in like manner, sending one detachment under Blücher toward the Marne. The other detachment, under Schwartzenberg, did not pursue vigorously due to a belief that the column lacked strength. Napoleon, therefore, succeeded in withdrawing his forces in safety. Generally, however, the policy of a division of forces in retreat is condemned. A lost battle in itself tends to division and disorganization, and the first work of the defeated general should be to regather his forces and to effect their concentration rather than their dispersion, in order to regain order and control and to reestablish confidence and morale.

CHAPTER XI

INFANTRY

In early times the foot soldiers of armies were usually the more inferior warriors. The best men were mounted. This may be seen in the cavalry of the Middle Ages, which consisted of knights encased in armor. The Swiss mountaineers and the archers of England, however, created respect for the infantry arm. Infantry in the modern acceptance of the term did not exist until after the introduction of gun powder brought into use the musket. Since that time infantry has become the most important part of an army, and to-day the infantry is in fact the army. The other arms are now merely auxiliary to the infantry. Prior to the introduction of gun powder the infantry in battle, armed with the pike and spear were formed in solid squares in order to offer the necessary resisting power to the armored knights. After the introduction of the musket, however, a change was made necessary in tactical formations to allow room for the loading and discharge of the

muskets. It was also necessary to avoid presenting too large and deep a target to the opposing musketry fire and to the newly invented field artillery. For a time, however, pikemen were retained as a part of the infantry tactical organization to supplement fire tactics with shock tactics when necessary. The first muskets were so heavy that they required a rest in order to be effectively fired, and discharge was effected by means of a match. These muskets were known as matchlocks. Later this cumbersome method was replaced by using flint to ignite the charge. These muskets became known as flint-locks.

The manual of arms used in the handling of the earlier types of musket was exceedingly clumsy. It is said that one of these manuals prescribed ninety-four distinct motions to execute the command to load. During the wars of Louis XIV the bayonet was introduced. This resulted in the disappearance of the pike and a still further reduction in the density of the infantry line. By that time the custom was to have the infantry line four ranks deep, the first two ranks being composed of musketeers and the remaining two ranks of men who loaded for the first two.

Under Frederick the Great precision in the

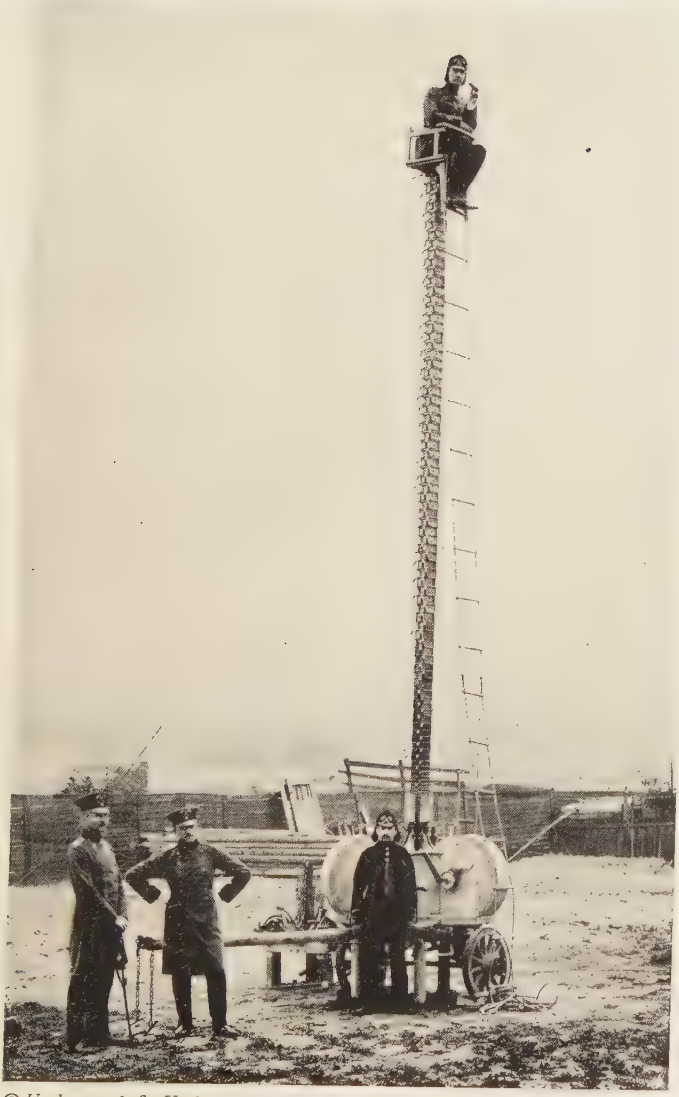
manual attained a high standard and the infantry in action succeeded in delivering volleys rapidly and with facility. Under Frederick, the Prussians were also trained intensely in the use of the bayonet. The effective range of the musket in the time of Frederick the Great was between 100 and 200 yards, but in wet weather the weapon was of little use.

Under Napoleon, infantry skirmishing was highly developed. The precise tactics of Frederick the Great were not followed. The French infantry methods were more flexible. Small columns for maneuver and assault were adopted, and lines were deployed for firing. Time and space do not permit more than passing reference to the development of the infantry in the various stages of its evolution. It may, however, be said in passing, that the American War of the Rebellion saw a remarkable development in the power of infantry due to an increase in military marksmanship. This war developed the system of infantry advance by rushes and by successive deployed lines and the use of hasty intrenchments.

The advance by rushes, however, used in the Civil War was not in any sense the counterpart of the present day advance. The infantry of the

Civil War period was armed for the most part with muzzle loading muskets, and it was almost a requisite in the loading of these weapons that the soldier should stand erect in order to use with facility the ramrod and return it to its position in the groove below the barrel provided for that purpose. The time involved in loading such muskets, and the necessity for standing during the operation of loading, created such delay when advancing infantry was halted for the purpose of firing, that every effort was made to push the lines forward as far as possible before halting to fire. The infantry advance was, of course, covered by the fire of friendly artillery. The artillery fired over the heads of the advancing infantry against the opposing batteries and the intrenchments of the opposing infantry, in order to disconcert and minimize the effect of the opposing fire. In most cases, therefore, in Civil War battles, there was no attempt made during the infantry advance to obtain what at the present time is known as "fire superiority" as a part of the infantry advance. The theory of fire superiority will be shortly explained.

The infantry attack of the Civil War period cannot better be exemplified than by reference to



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A portable folding observation tower as used in the German Army

the third day of the battle of Gettysburg. Before commenting on the Confederate attack made against Cemetery Ridge on that day, the character of the infantry which made that attack should be appreciated. Charles Francis Adams in an address delivered in 1907 at the Washington and Lee University in Virginia, on Lee's Centennial, summarized the morale of the Army of Northern Virginia when it entered the Gettysburg Campaign, as follows:

"In the first place Lee had at that time supreme confidence in his command; and he had grounds for it. As he himself then wrote, 'There never were such men in an army before. They will go anywhere and do anything, if properly led.' And for myself I do not think the estimate thus expressed was exaggerated; speaking deliberately, having faced some portions of the Army of Northern Virginia at the time, and having since reflected much on the occurrences of that momentous period, I do not believe that any more formidable or better organized and animated force was ever set in motion than that which Lee led across the Potomac in the early summer of 1863. It was essentially an army of fighters,—men who, individually or in the mass, could be depended on for any feat of arms in the power of mere mortals to accomplish. They would blanch at no danger. This Lee from experience knew. He had tested them and they had full confidence in him."

This was the type of soldier that constituted the infantry of Lee's army at Gettysburg.

On the third day at Gettysburg, Pickett's Division of Longstreet's Corps was directed to attack the center of the Union position along Cemetery Ridge. The attack was prepared by the Confederate artillery pounding the Union line with all their available guns. The Confederate infantry was to advance as soon as the Union artillery was silenced and the Union infantry demoralized by the Confederate artillery fire. At 3:00 P. M. the men of Pickett's Division moved out from behind their own batteries, and with lines well maintained walked toward the Union intrenchments without stopping to reply to the opposing fire. About half way to the Union line they halted for a short rest in a ravine somewhat sheltered from the Union artillery fire, which had opened upon them, and then proceeded forward. When they had advanced sufficiently far to the front, the Confederate artillery reopened over their heads against the Union line. The Confederate Division under Pettigrew advanced on the left of Pickett's Division. Both divisions crossed the Emmitsburg road together, and thereupon came under enfilade fire from the two wings of the Union line, from Cemetery Hill on the north and the Round Tops on the south. Livermore says:

"Their graceful lines underwent an instantaneous transformation in a dense cloud of smoke and dust; arms, heads, blankets, guns and knapsacks were tossed in the air, and the moan from the battlefield was heard amid the storm of the battle. Both flanks of the advancing line were shot to pieces while in the center the losses were made up by those who were led by their instinct and their object to crowd toward the clump of trees."

The clump of trees referred to, marked the part of the Union line to be assaulted.

Some of the regiments of Pickett's Division actually reached and jumped over the stone wall which marked the Union line, but of 14,000 men who commenced the attack, not more than a few hundred actually reached the wall.

Under modern conditions, with the rapidity of fire of both field artillery guns and infantry rifles, an infantry attack, conducted as was the attack of Pickett's Division, would have resulted in the annihilation of the attacking forces long before it reached the enemy's position.

The tactics used by the German infantry in the Franco-Prussian War of 1870, may be illustrated by reference to the interesting account of the attack delivered by the Kaiser Franz Regiment at LeBourget, described by Hohenlohe in his letters on infantry. He says:

"At this point there were two battalions of the Franz Regiment who had to attack over 2000 paces of open ground. The officer commanding this regiment had already practised it in the attack. In accordance with his practise, he sent forward the whole of the leading line, which consisted of two companies, in thick swarms of skirmishers, and made them advance over the open ground in two parts (by wings) which alternately ran in, 300 paces. After each rush the whole of the wing which made it threw itself down, and found some cover among the high potatoes; there they recovered their breath while the other wing rushed in. As soon as they arrived within the range of the needle gun, the wing which was lying down opened a fire of skirmishers on that edge of the village which they were attacking. I can still remember as I write, the delight which we felt as from our position we watched this attack which had been so carefully thought out and was so well carried through. The best of the thing was that, as the commander of the regiment assured me, these troops suffered no loss up to the time when they reached the edge of the village. It was not until the street fighting began that the regiment endured the losses which it had to deplore on that day."

In the Franco-Prussian War of 1870 the German infantry attacks were usually made by lines of skirmishers supported by other lines, and sometimes by columns in close order. Here we see the beginning of the practise which led up to the theory of superiority of fire, for the skirmishers engaged the enemy in a fire fight, disconcerted them in a degree commensurate with the effect-

iveness of their fire, and by successful advances reached a position from which, with the arrival of the supports, the assault could be made.

It is with the infantry, in the last analysis, that the enemy must be driven from the position in which he seeks to maintain himself. Owing to the efficacy of field intrenchments, it is obvious that the defenders cannot be shot out of such positions, for during a period of fire action alone the defenders will keep well down in their intrenchments, many of them provided with head cover, and wait for the storm to blow over. It is therefore necessary, in order to capture a position, that the infantry shall advance and physically make contact with the defenders, drive them away or destroy or capture all who remain. There is a psychology about all this which frequently enables the attacking forces when they arrive within 100 or 200 yards of the intrenched position, to occupy it without further resistance due to a sudden and simultaneous realization by the mass of the defenders that further defense is futile, and their hasty withdrawal in accordance with that judgment. Conversely it sometimes happens that infantry who have successfully advanced to the assaulting position after suffering great losses,

realize that a successful assault would be impracticable, and in consequence they either retire or dig into the ground and remain where they are until nightfall or the arrival of supports to give them the strength and impetus necessary to again carry them forward.

When the infantry therefore, in pursuance of the necessity of physically making contact with the defenders and of driving them from their position, commence the necessary advance for that purpose, it is evident that if they are to be stayed in their advance, the defenders must inflict such losses on them as will paralyze their advance before it reaches a position from which a successful assault may be delivered. This attempt to destroy the attacking forces during their advance is made by the artillery and the infantry of the defense, with their fire. If the defenders, occupying masked positions for their field artillery and intrenched positions for their infantry, knowing the ranges (often measured in advance), and supplied with ample ammunition, were permitted without hindrance to fire continuously upon the attacking infantry throughout the period of the latter's advance, it is evident that under such con-

ditions no infantry could hope, successfully to arrive at an assaulting position with enough survivors to deliver anything but a feeble attempt at an assault. Therefore it is that in the infantry attack an effort must be made coincident with the attack and as a part of it, to so embarrass and demoralize the defenders that they find themselves unable to deliver their fire with deliberation and accuracy. This is attempted to be accomplished by the fire of the attacking forces, so delivered as to cover the advance of their own infantry. The artillery of the offensive endeavors to seek out and silence the opposing batteries by covering them with such a deluge of field artillery projectiles that their *materiel* is destroyed or the cannoneers are unable to serve their guns. All the batteries not necessary for this purpose, turn the weight of their power against the intrenchments of the opposing infantry. This is not done under a belief that the shrapnel and shell so fired will reach the defenders while they remain deep down in their intrenchments protected by cover, but rather to destroy those who attempt to fire from the top of the intrenchment at the advancing infantry, and so to demoralize the defenders and

compel them to keep under cover or at least to so limit their fire efforts that the damage inflicted by them will be minimized.

This then is the problem of the infantry in the attack—to cross a fire swept zone, by any means which will enable them to assault with enough survivors and with sufficient remaining morale, to make the expectancy of success a reasonable one. And with the infantry in the defense the problem is to minimize losses and to prevent demoralization from the enemy's big gun fire, so that when the advance of the attacking infantry reaches an acute stage, they may deliver a fire of such accuracy and volume, that the attackers will be shattered with losses and swept back.

There are many modifications of this simple outline of the infantry in attack and in defense. Sometimes for example infantry meets infantry in head on collision, a *rencontre* as it is called. Both may attack, each commander believing that his mission calls for aggressiveness and that he has the necessary strength. Again the infantry frontal attack may be what has been called a holding, or secondary attack, made for the purpose of deceiving the enemy and holding his attention while the main forces of the attacker envelop a

flank of the defenders and deliver the main attack against the flank. But it will be found that these and similar operations when the enemy is trained and resourceful, usually resolve themselves ultimately into the more or less conventional attack and defense above outlined. For when the intrenched defender is notified by his patrols sent out for the security of the flank that the enemy is advancing against the flank, he bends back the threatened flank and mans the new line with men from the front line, or from supports and reserves; so that when the enemy's main attack is made, he finds himself confronted with the problem of delivering a frontal attack where he hoped to make a flank attack.

It is evident from the foregoing, that in the practical solution of the problem presented to the infantry in the attack, his weapon and its use play an all important part.

Much has been said in the public press concerning the methods in use in the existing war abroad, governing the formations of the infantry in the attack. Comparative accounts have been frequent illustrating the great losses incurred by one side as a result of what the articles designate as "massed formations." At the same time the

advantages of attack formations which provide for wide intervals between the men in the advancing line, are favorably commented upon. As a result of these writings much misunderstanding has resulted in the minds of many persons concerning the infantry attack in battle, and the foreign commanders and their forces have in some instances been credited by public opinion with methods and theories which have no foundation in fact.

In all the great armies of the world, it is recognized that the infantry is the army—the rest being auxiliary thereto. In every army, the problem of the infantry attack is recognized as one of crossing a fire swept zone with enough infantry to deliver the assault successfully. While each army has its own detailed methods of executing the advance, they do not differ materially in principle, and an explanation of the use and influence of the rifle in relation to the attack, and of the theory of fire superiority, will serve to illustrate the general practise in all armies.

It may be said generally that infantry fire in the attack is delivered for the purpose of producing results of two classes, the first, actual casualties, and the second, by demoralization. Infantry

fire produces these results in two ways. First, by the continuous and successful delivery of a well aimed fire which has the effect of gradually lessening the morale of the defenders by the infliction of losses, and by compelling a realization of the futility of attempting to reply to the fire attack with a well aimed and effective fire; secondly by paralyzing the enemy with such a sudden and unexpected volume of fire that he is momentarily incapable of effective reply. This latter result is an exceptional one and usually follows a battle opportunity suddenly presented to the attacker when he finds the opponent open to such fire assault. When such opportunity is offered and taken advantage of in the manner indicated, it is often practicable to effect capture of the forces so stricken. In other words, good troops may preserve their morale in spite of a high percentage of casualties if the casualties are so extended as to cover a considerable number of hours, whereas they might completely lose their morale if the same percentage of casualties were inflicted upon them suddenly and within a short space of time. It has been stated that to enable the attacking infantry to advance it must first dominate the fire of the defenders. One of our American

authorities on the subject of infantry fire in battle [1] says that:

"Fire superiority can be attained only by inflicting upon the enemy in a given space of time more losses than he himself occasions."

It must be evident, however, that this is not literally true; but the statement serves to crystallize the principle that the advancing infantry to avoid losses which would make its further advance impossible, must shoot into ineffectiveness the fire of the defenders. This is accomplished not only by the decrease in rifle bearers among the defenders, represented by the casualties inflicted, but also by the moral effect of the attacker's fire.

Among the public, the opinion generally prevails that success in attaining fire superiority is dependent upon individual marksmanship. The following interesting considerations will serve to show that such belief is not correct, although individual marksmanship is a factor in fire efficiency.

Let us assume a force of one hundred men charged with the mission of attacking an intrenched force of one hundred men, distant from

[1] "The Rifle in War," Eames.

the initial firing point 1200 yards. The attacking force does not know the range accurately. The range must be estimated. It is obvious that it would be impractical and lead to confusion if every man were to make his own estimate of the range and fire accordingly. Were this done and the resulting shots could be observed by dust kicked up here and there, it would be impossible to tell whose shots were going over and whose falling short. It is therefore up to the commander to announce the range at which the sights will be set. He may rely in making his decision upon the estimates of one or more men known by experience to be best qualified for this, but in the last analysis he must determine the range and require the men to set their sights accordingly. We will assume that his estimate of the range is 1100 yards. The men set the sights, and at the command to commence firing they aim at the intrenchment and begin the delivery of their fire. The captain and his officers watch through their glasses the results of this fire. As a matter of fact at ranges above 500 to 600 yards in ordinary country, it is extremely difficult to pick up the impact of rifle bullets. If the ground is moist and there is considerable vegetation and few stones or

rocks, it is almost impossible to tell where the shots fall. If, however, there has been a period of drought, and the ground is dusty, vegetation sparse, and there are numerous rocks and stones in the vicinity of the target, the impact of the bullets will here and there throw up little clouds of dust or pulverized stones which serve to mark the zone covered by the bullets. We will assume in this particular case that the captain finds it necessary to have the firing continued for about ten minutes before he can locate enough shots to determine the zone or belt of their fall. He sees some of the bullets striking the top of the intrenchment and throwing up dust. He sees some cut off small branches and twigs from bushes beyond the target, while at the same time he sees evidence that many of the bullets are falling short.

Now let us assume that of the hundred men who are firing twenty per cent are expert in the use of the rifle, sixty per cent are mediocre shots and the remaining twenty per cent have had no experience and training with firearms. As the sights of all the hundred men are set at 1100 yards when in fact the true range is 1200 yards, is it not evident that none of the bullets fired by the expert riflemen are producing any effect, either actual

or moral, on the enemy? These men, correctly and carefully aiming at the target, are striking the ground with their bullets one hundred yards in front of the target, the presence of grass perhaps preventing observation of their fall. This is so because their sights are set at 1100 yards when the correct range is 1200. Of the sixty per cent of mediocre shots in the company, many of them possess eccentricities of firing which serve to derange the line of fire when they pull their triggers. All of their shots do not fall at 1100 yards owing to these eccentricities. Some of them fall short of that distance, while others fall beyond; and of the latter group a percentage strike the intrenchment and may even inflict casualties on the enemy. Even among the twenty per cent of men of the company who have had no experience and whose fire is more or less wild, it will be found that some of their shots will strike on or about the enemy's line. So we have the odd result that the men who are contributing least toward the attainment of fire superiority are the experts of the company.

The subject of fire action in combat is really so extensive that no more can here be attempted than to point out that for the attainment of fire supremacy in battle much more is necessary than

individual marksmanship. The idea that a nation of individual marksmen would prove invincible in war, has no basis. There are many other essentials which can only be provided by careful drill and training.

Let us consider another factor of importance in the attainment of fire superiority. We will again assume the conditions above mentioned, except that the attacking force has now correctly estimated the range, and that the sights are set accordingly. The defenders also have the correct range. It is now a fight for fire superiority, each side seeking to inflict the greater losses on the other. We will assume that the efficiency of the individual men of both forces is the same, that each presents the same size of target to the other, and that both sides are inflicting casualties at the rate of three per thousand shots fired. The attackers are firing at the rate of ten shots per minute per man, while the defenders are firing at the rate of five shots per minute per man. In each minute therefore, the attackers fire one thousand shots and inflict three casualties on the defenders, while in the same time the defenders fire but five hundred shots and inflict less than two casualties per minute. Assuming that the fire is

maintained on this basis for a period of ten minutes, the attackers will have inflicted casualties of thirty per cent, on the defenders, while the defenders will have inflicted on the attacking force casualties of but fifteen per cent. It therefore becomes evident that there is an additional factor in the attainment of fire superiority, namely—fire rapidity. Under actual conditions, of course, the foregoing assumed factors would not be constants. They would be variable factors for the reason that when the losses of the defenders begin to climb upwards, their morale would begin to be shaken, and this loss of morale would lessen the correctness of their aim. In consequence, they would not in fact have inflicted on the attackers the rate of loss above mentioned after the first few minutes. When it became apparent to the attackers that their own fire, by reason of its accuracy and rapidity, had disconcerted the enemy to the extent described, in other words that fire superiority had been temporarily attained, the commander would endeavor to hold this fire superiority with part of his line while he pushed forward the remainder closer to the enemy. When the advanced subdivision had again taken up the fire after readjusting its sights and were

able to take over from the other subdivision the duty of holding the fire supremacy, the remaining subdivision would then be rushed forward to the new alignment or perhaps even advanced beyond the new alignment.

To illustrate another factor that enters into the attainment of fire superiority, let us assume that the attacking line is now engaged at a range of 900 yards, and is firing at the rate of ten shots per minute per man and skimming the top of the enemy's intrenchment at the rate of three shots out of every one hundred shots fired. We will assume that this danger space above the intrenchment extends from the top of the parapet to a line ten inches above the same. It is in this zone that the heads, arms and shoulders of the defenders appear when they are using their rifles. The attacking force in like manner, we will assume, are within a belt ten inches high, extended as they are in the prone position. The defenders are firing at the same rate and are delivering the same percentage of bullets within the belt constituting their target. We will assume this difference however—that the attacking force has made no effort to apportion the target and distribute the fire, but that each man of his own

initiative is selecting a particular point in the enemy's line to be fired at. The defenders on the contrary, pursuant to orders of their commander, have apportioned the attacking line into what are called fire sectors. The captain has designated the right half of the attacking line as the fire sector for his own right platoon, and the left half of the enemy's line as the fire sector of his own left platoon. Each platoon is therefore firing at that part of the enemy's line which is opposed to its front and it confines its fire entirely to that sector of the enemy's line. In like manner the platoon commanders subdivide the fire sectors assigned them, among the squads composing their platoons. This is what is called fire distribution and its importance will be noted in a moment.

Reference has been made to the influence played by psychology in warfare generally, and in combat, particularly. Nowhere is this better illustrated than in the fire fight, for it is well known that the soldier in action mechanically turns his rifle on a target which attracts his attention as being particularly vulnerable or which in some other manner exerts a psychological influence over him. Thus in field firing problems where targets representing soldiers have been placed in a trench and

the trench carefully screened by bushes, except in one small sector where a view may be had of the hats and heads of the dummy defenders, it is found that the attacking soldiers find themselves attracted to fire on what they can clearly see rather than on the vague and illy defined target marked by the intervening brush. And so it has happened in such fire problems that certain dummy figures in the trench have been shot to pieces while many others have remained unhit. In the problem assumed, although all the other factors have equal value, that of fire distribution in the case of the defenders, has a high value while in the case of the attackers it has no value. It will, therefore, be found in estimating actual casualties (as distinguished from bullets passing through the belt mentioned) that the attacker in this instance will fail to attain fire superiority and that his advance will be stayed. This illustrates the importance of proper distribution of fire. The foregoing examples thus briefly outlined will serve to illustrate that in the organized shooting of military combat there is much more in the problem of success than mere individual marksmanship.

In a combat, what has been described in the case

of a single company, is more or less continuous along the opposing lines, and this brings us to a consideration of the so-called "massed formations" in conducting an attack. It must be evident that the greatest security of the attacker against the infliction of casualties from the defender's infantry fire is the superiority, pursuant to the principles above laid down, of his own fire. In the statement of facts above assumed for the purpose of illustrating other factors besides individual marksmanship entering into success in infantry combat, it was assumed that one hundred men were pitted against one hundred men. Let us now assume that instead of fixed numbers, there are designated positions on the one side to be held and by the other side to be attacked. It must be evident that the greater number of rifles which the attacker can bring to bear on the enemy's position, in the conduct of his attack, the greater the number of bullets there will be fired against the position per minute, all other factors being equal. But additional rifles on the line means additional men on the line, and since the establishment of the principle of the necessity for fire superiority as a preliminary to successful advance, there has been an increasing tendency to fatten the firing

line with men, until now in most armies their number is limited only by the space necessary for the proper use of their weapons. Thus in the United States service the firing line in action numbers a man per yard. This places them in the prone position practically side by side, and as close together as the use of their weapons will permit.

There are many views and many devices held and offered as means for getting men forward into the firing line with a minimum of loss. Largely the selection of the particular method to be employed depends on the distance of the enemy, whether or not the opposing fire is field artillery shrapnel, rifle fire, machine gun fire or a combination of these, and the character of the terrain over which the advance is to be made. Generally speaking, however, infantry going into action, keep in column as long as such formation is consistent with safety and there is cover to protect them in such formation. This is done because the command may thus be maneuvered with greater facility, and the men kept under better discipline and control. But when the point is reached, when to continue in close formation would tend to endanger the safety of the com-

mand, it breaks up into subdivisions. For example the regiment will break up into battalions. Usually one battalion is designated as the reserve and is kept under the immediate command of the colonel. The remaining battalions continue the advance, but shortly break up into companies, one company usually being held by the major under his personal command as a support for the three remaining companies, which usually constitute the firing line in the first instance. The three companies which are to constitute the firing line in each battalion may deploy as skirmishers connecting with the other battalion and move forward in that manner until the enemy's fire compels them to halt and seek for fire superiority. On the other hand it may be that owing to the nature of the ground, better cover may be secured if the companies instead of presenting to the enemy's fire a line of skirmishers, present themselves in columns of twos, or in platoon columns. This formation might be described as sending the line "end on" toward the enemy. No fixed rule can be prescribed for all occasions of combat. In general, however, it may be said that such method will be adopted as under the circumstances will best enable the men to get as close to the enemy

as possible with the least losses, before being compelled to halt and commence the fire fight for superiority. In like manner the supports and reserves are pushed forward so that they may be fed into the line as needed to replace losses and maintain the firing power of the line at its limit, and to advance readily at the time of the assault in order to support the line and secure the victory.

In the entire field of peace-time fire training there is no more pernicious factor in the United States than the artificial one of the known range. The fact that in combat the range is unknown and must be measured with instruments or estimated, would naturally suggest that this factor be early introduced into the fire training of the soldier. Yet it will be found that in rifle practise generally, and in practically all the prescribed military rifle matches the contests are conducted at known ranges.

Brigadier General R. K. Evans, of the United States Army, in a lecture on Infantry Fire in Battle, delivered at the Army War College, said:

"In all the domain of human endeavor the actual practical results of fire action in battle present the most pitiful failure. The fault does not lie with the gun, but is entirely due to lack of proper training and handling of the man behind the gun."

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This photograph demonstrates the effectiveness of air-craft in making observations of the enemy's country

The physical, mental and nervous strain which the infantry soldier is subjected to in the modern battle is well exemplified by the occurrences of the present war in Europe. The limit of endurance often appears to have been reached, but further events frequently indicate continued fighting by the same organizations. It is largely a matter of psychology and training. Racial characteristics are of course carried into battle by soldiers, and as those characteristics are martial or not, the fighting ability of the soldier is increased or lessened. But, when the opposing forces are both possessed of the individual qualities valuable in battle—courage, determination and physical fitness—the advantage, irrespective of leadership and numbers, should be with the forces having the better discipline and training.

By discipline and training is not meant that conventional expertness in performing set drill movements or manipulating the weapons carried, so often mistaken by the general public for real discipline and training. Such conventional expertness is merely one of the aids to proper discipline and training. It is relatively of no importance in battle whether men have been taught to execute the manual of arms one way or an-

other; whether they form squads according to one method or as prescribed by another. Military discipline and training strike much deeper. They grasp at the very spirit of the man. They hold before his mind the highest ideals of loyalty to fatherland, respect for the law, and sacrifice of self for the good of the many. By a vigorous course of physical exercise, they increase the physical fitness of the soldier to a degree which makes possible the physical exertions of campaign and battle. With all the devices that have come down through the ages of military preparation, they coordinate the spirit and the physical fitness so developed, in order that the spirit may dominate the mere nerves and muscles that constitute the physique. This ability of the spirit of the soldier to subordinate his physical weaknesses to his obligations, has been variously called pride, *esprit de corps* or morale. The latter is the more comprehensive term. Discipline and training therefore develop the moral character of the soldier, and seek to build up a morale strong enough to carry him through the vicissitudes of battle.

The subject of morale and its development, is a thought world in itself. Every art and science

have been drawn upon where necessary for the furtherance of its ends. Suffice it to say here that it is largely a psychological study, and that of all the arms of the service represented in an army, nowhere is morale so important as in its infantry. The field artillery-man in action is psychologically chained to his guns. The horses are away under cover, while the guns and shields afford him some protection at least. While he is thus led to remain, he is actuated to perform his functions by the instinctive desire to do something—to act. These psychological factors, all aid the dictates of his morale to perform his duty.

With the cavalryman, the horse is an influence not to be disregarded. When subjected to fear inspiring conditions, the instinct of the cavalryman is nevertheless not to forsake his horse. The animal is clung to as a possible means of safety. With the sounding of "the charge" the horses are away at a gallop, mechanically and together, carrying off to duty and honor some who were perhaps unwilling actors. None of this applies to the infantryman. In the attack he advances over any terrain. While he seeks cover when halted to fire, he must leave it promptly and expose his body when the signal to advance is given. Some-

times he is advancing through woods or bushes, and the temptation is great for him to hug his cover and let the line go on without him. Perhaps he will not be missed, or it will be assumed he has been wounded. In the attack he is expected to advance, always to advance, and always getting closer to the enemy; and the advance is but preliminary to the assault, where he is expected to spring forward with the bayonet and meet his enemy in personal physical encounter. To develop a morale to meet these requirements necessitates a discipline and training which are something more than mere precision in mechanical drill.

CHAPTER XII

CAVALRY

Prior to the introduction and use of firearms, the cavalry was the *corps d'élite*. The mounted man was of superior caste. He usually had the means to provide himself with superior weapons and armor, but in consequence he was frequently so weighted down in combat that as a cavalryman he lacked the mobility for true cavalry action. Frequently both horse and rider were so protected with armor that both were invulnerable so far as the weapons of their time were concerned. It is said that in some of the combats of the middle ages, the only knights who were killed were those who through accident were unhorsed. Owing to the weight of their armor they were unable to arise, were trampled upon and suffocated! The armor of a knight often equaled in weight that of the wearer.

After the introduction of the musket the knights made a vain attempt to maintain their importance as warriors by increasing the resistance of their

armor so as to withstand the impact of the infantry projectiles. The development, however, of infantry firearms was too rapid. About 1521 the pistol came into use in the cavalry. To-day the pistol is used as a weapon for individual self-defense, and on rare occasions for individual offensive action; but when first introduced, it was used as a substitute for other weapons. In combat, the cavalry rode up several lines deep, and as the first line discharged their pistols, they moved to the right and left, leaving the way open for the next succeeding line, which thereupon advanced and fired, being succeeded in like manner by the next line. These cumbersome tactics were not effective when the enemy's cavalry adopted shock tactics and charged aggressively into the formation. As the ineffectiveness of armor became apparent, it was gradually lightened, but the helmet and cuirass were retained as a concession to conservatism, and in the France of to-day may be found the cuirassier with helmet and what represents the cuirass of the sixteenth century.

Up to the time of Charles XII, of Sweden, cavalry generally charged at a trot, the practise having its origin in the days of armor when the horse was so weighted down that he could not charge at

a faster gait. Charles XII, however, abolished the helmet and cuirass in his cavalry, prohibited the use of mounted fire action and inaugurated the charge at a gallop. His cavalry were armed with the long, straight sword which was used as a thrusting weapon. This type of weapon has lately replaced the saber in the U. S. Cavalry.

Frederick the Great developed the efficiency of the cavalry to still higher standards. He not only prohibited the use of mounted fire action and prescribed the charge at full speed, but he so disciplined and trained his cavalry that large bodies could maneuver with facility and charge without confusion. It is interesting to note that the cavalry of Frederick's armies ultimately numbered one-fourth of the strength of the infantry. This is the highest proportion of cavalry to infantry recorded in any of the armies of history. Frederick used the cavalry so extensively that they decided most of his battles. His cavalry was developed as a battle field force, and was not specially efficient in reconnaissance work.

The cavalry of France at the end of the eighteenth century consisted of heavy cavalry, carbineers and light cavalry. The carbineers were armed not only with the pistol and straight sword,

but with a carbine provided with a bayonet. Napoleon developed the French cavalry to the greatest efficiency, not only in the work of actual combat, but in reconnaissance and screening. In battle he frequently directed the cavalry to charge at the crucial moment, and when this was done, the impact was delivered with large numbers. Napoleon restored the helmet and cuirass, which had shortly before been discarded. Fire action was sometimes resorted to, mounted, but shock action was the main reliance. Horse artillery was provided to accompany the cavalry and developed great facility of action in cooperating with the cavalry.

The American Civil War saw a remarkable development in the rôle of the cavalry. From an insignificant force of a few regiments of regular cavalry at the outbreak of the war, the Union cavalry finally numbered 80,000 men. The Confederate cavalry while not as numerous, was extremely efficient. The names of Stuart, Forrest, Fitzhugh Lee, Wheeler, and Morgan, serve to recall the intrepidity and value of the cavalry arm to the Southern cause.

In the War of 1866 between Austria and Prussia, little that was new in cavalry action was de-

veloped. The use of the cavalry on both sides indicated a failure to grasp the possibilities of the arm. Its reconnaissance work was limited, no raids were made against opposing lines of communication, and in the retreat of the Austrian forces, the pursuit was not pushed aggressively by the Prussian cavalry.

In the Franco-Prussian War, Germany entered France with about 50,000 cavalry. The French cavalry was about 10,000 less in numbers. The Germans profited by their experience in the War of 1866 with Austria, and did not repeat their tactics of that period. On the contrary, the operations of the cavalry of the German army in the War of 1870, were marked by aggressive enterprise. The German cavalry preceded and fully screened the movements of the infantry divisions, and fought a series of independent combats which mystified their opponents. The cavalry tactics of the Germans in that war, so far as reconnaissance and screening work are concerned, are held to be models of what cavalry action should be. This serves to illustrate the importance to a nation engaged in war, of recent experience in war. There are many such examples furnished by history. In the present war in Europe, favorable comment is

constantly heard of the action of the Russian troops, and the British troops. A high efficiency was expected of the great armies of Germany and France, but in the public mind, the defects of the Russian arms in Manchuria and of the British in South Africa, were still fresh and seemed to furnish ground for a belief that as much could not be expected of these forces as of the troops of Germany and France. But the experience of Russia in Manchuria and of Great Britain in South Africa, were most valuable. These conflicts provided not only the best of training, actual experience in war itself, but constituted a test of the practical and the impractical. The shortcomings developed by war were sedulously sought to be eradicated after the war, and it is known that the Russian and British armies in the present war in Europe are very different organizations from those which represented the Russian and British governments in the Manchurian and South African campaigns. And so in the Franco-Prussian War, Germany had the great advantage of her experience in the Austrian campaign, and in no way did the Germans better illustrate the manner in which they profited by their experience than in the use of the cavalry. In many respects, however,

the cavalry of both the Germans and the French failed to reached the high standard of accomplishment attained by the American cavalry in the Civil War. As a fighting force it was not as versatile or as enterprising. It did not fight on foot as readily nor maneuver for effective position as persistently and successfully.

The Boer War in South Africa developed on the British side the use of mounted infantry, but they were not in any sense cavalry. They were mounted for the purpose of providing a mobility which infantry would not otherwise possess. The British cavalry after the earlier stage of the war did excellent work. Some of the most brilliant work on the Boer side was done by their mounted commands, but in their organization, discipline and training they were not cavalry in the sense that the term is used in the great armies of the world.

In the Manchurian Campaign the Russians were opposed by an inferior cavalry and yet the Russian operations do not indicate that advantage was taken of this fact. The Russian operations do not seem to offer any important lessons in the use of cavalry under modern conditions.

We know little that is authentic of the opera-

tions of the cavalry of the armies now engaged in the great war in Europe.

It is most important that in time of peace a nation maintain in its regular forces a high percentage of cavalry, for the reason that the efficiency of cavalry in war depends not only upon the intelligence and training of the men, but upon the suitability and training of their mounts. The training of cavalry horses takes much time and intelligent application of the principles of horsemanship. Under the conditions of modern warfare the infantry in a populous nation may be augmented by vast numbers of reservists who if not trained soldiers are at least capable, with a reasonable amount of training, of conducting defensive operations. This is not true of the cavalry arm. The efficiency of cavalry depends, not only upon the availability of an intelligent and physically fit personnel who are individually capable of riding the animals furnished them, but upon the degree of coordination which exists between the riders and their horses and between various groups or subdivisions of the cavalry organization. Particularly has this application to that important branch of cavalry activity known as screening and reconnaissance.

From the date of the commencement of a campaign the wastage of men, animals and military property begins, and its extent is dependent upon the degree of hardships and non-success experienced, and the duration of the campaign. While there are reservists available and in process of preliminary training, the wastage in men may be made up, but the wastage of cavalry horses is not so readily replaced. The cavalry requires something more than a mere draft animal or beast of burden, and even eliminating the essential requirement that cavalry horses should have training, the number of horses of a proper type for cavalry service is in most countries limited.

In the United States a realization of these facts and a commendable prudence, have prompted the Government to maintain the cavalry of the regular army in numbers greater than the organization of the army on a peace basis justifies under established principles governing the organization of an army. In the event of war, however, it is believed that the cost of maintaining whatever may be considered as an excess above the requirements of proper organization, will be found to have been money well invested, and which will make adequate return as a result of their availa-

bility in considerable numbers for immediate and efficient use.

The consensus of military opinion is that under modern conditions the cavalry has been driven from its former position of prominence on the battle field. This has been the result of the great development in effectiveness of field artillery, small arms and machine guns. Cavalry under modern conditions will therefore as a rule, never willingly engage in a combat of the type best described as a pitched battle, except possibly against hostile cavalry in a *rencontre.* This comment, of course, refers to mounted action; that is to say, to strictly cavalry action. In such action the large target furnished by the cavalry and their inability to inflict damage upon the enemy during the period of time which must elapse from the beginning of their advance to the actual impact of their charge, present conditions which spell annihilation. While this is true concerning combats of the character mentioned, the importance, generally, of the cavalry arm in other fields of activity has increased. The cavalry squadrons are the eyes of the army.

These eyes are now supplemented by others in the form of aerial war craft, but it should be re-

membered that the mission of the screening cavalry is not only to secure information concerning the enemy and to report the latter's movements, but also by driving back the enemy's patrols and detachments, to prevent the enemy from learning of the movements of their own forces. This latter is a function which aerial war craft have not yet been able to perform. A well-trained cavalry will not only by reconnaissance obtain needed information for their own forces and screen the movements of the latter, but are capable by their mobility of making early seizures of important points, and by their versatility and fighting powers, to hold them until the arrival of supporting forces.

Many officers of infantry profess to see a great difference between the efficiency of the best cavalry and good infantry, in the work of combat ordinarily falling to the lot of the infantry, and as one of the evidences of inferiority, it is pointed out that the cavalryman does not even possess that important weapon so characteristic of the infantryman—the bayonet. It is contrary to the teachings of military orthodoxy of the present day to discount the value of the bayonet in combat. As a result of the Manchurian Campaign interest in bayonet exercises was rejuvenated in the United

States, and the advocates in the United States, of bayonet training will find much to support their views in the daily accounts of bayonet casualties in the present war in Europe. Official reports when they become available after the termination of the war, will undoubtedly show that these bayonet casualties were largely mythical or at least greatly exaggerated. It should be remembered that the relative efficiency of weapons depends greatly on the traditional characteristics and previous training of the men who are to use them. The Moro with the bolo is a much more formidable opponent under the conditions in which he fights than the Moro with a loaded magazine rifle. It is common knowledge that the Latin races readily become adept in the use of cutting weapons such as swords, rapiers, stilettos, machetes and knives. The British and Russians pride themselves on their skill with the bayonet, and constantly refer to their reliance on "cold steel." The Germans and the French have impartially relied on both the bayonet and fire action. But the American is essentially and traditionally a rifleman. Practically every American home, particularly in the country and rural districts, has its rifle and shotgun. Indeed, the average American home fre-

quently possesses a modest arsenal. Deeds of violence in the United States are usually committed not with knives or cutting weapons, but with guns and pistols. The average American has more money to spend than has the European, and is in consequence better able to purchase ammunition. It will be found on investigation that in the United States the passing of the hunter and the man generally who uses firearms has not been anything like as marked as some would have us believe. In the fall of the year every patch of woods from Maine to California in the vicinity of inhabitants resounds with the crack of the rifle and report of the shotgun of the seekers after game. The United States Government liberally indulges the fire training of its soldiers, both regular and militia, and it is believed that the mean standard of American marksmanship is far above that of Continental Europe. With the American soldier there is no inherited tendency in close combat to discard the use of his rifle as a firearm and to use it as a lance. If he can effectively use it against the enemy when fifty yards or one hundred yards from an intrenchment which he is assaulting, there is no reason why he should not use it more effectively at a range of three yards or ten yards, and

at such short distances its superiority over opposing bayonets which cannot reach him must be apparent. But the advocates of the bayonet point out that there will be a time when the soldier arrives at the place of physical contact with no ammunition and that recourse must necessarily be had by him to the bayonet; that if he is not adept in its use he will lack confidence and fail at the critical moment. It has been pointed out, however, elsewhere in this book that physical contact in most cases is a fiction, and that the success or nonsuccess of the assault is usually determined at a distance of fifty to one hundred yards from the intrenchment; that the decision is a psychological one. If it is admitted that the loaded rifle at a few paces is a more effective weapon than the bayonet and that the only necessity for bayonet training is the possibility of lack of ammunition at the critical moment, this shortcoming could readily be provided for by requiring the infantry soldier to always reserve one clip of cartridges for a possible assault as he now reserves, pursuant to the strictest regulations, the emergency ration for possible famine.

The tactics of the Boers in South Africa illustrate forcibly the inherent differences in peoples,

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Engineers of the Austrian Army constructing a pontoon bridge for the transportation of troops and artillery

which should influence the selection of the weapons with which they are to fight. The Boers were ultimately defeated, not only because they were so greatly outnumbered, but because they lacked discipline and subordination to military control. They seldom used the bayonet and relatively but few of them were armed with the bayonet. They were largely mounted. Many cavalry writers deny that they were cavalry in the proper sense of the term, and sometimes refer to them as mounted infantry. However that may be, they were excellent horsemen and extremely formidable with their fire action. They fought equally well mounted or afoot. There are a number of reported instances where they effectively charged mounted, using their rifles during the charge. An effort to have taught the Boer soldier the use of the saber would probably have been futile. The effect would doubtless have been to turn an effective gun man into a shiftless *sabreur*.

Warfare has been marked throughout its evolution by radical departures from accepted practise at various times, which have often constituted the real grounds for great success. While the bayonet will probably be retained in the infantry, its comparative efficiency as a weapon, so far as

the American soldier is concerned, does not rate high. In the battle of Santiago in the Spanish-American War, the United States cavalry fought as infantry. They were armed with carbines which were shorter and not as effective as the rifle with which the infantry was armed. These carbines were not provided with bayonets. The cavalry successfully assaulted the sectors of the enemy's intrenched position assigned to them to attack, and it is not recorded that they were handicapped by not possessing bayonets.

In the development of military preparedness among the great nations of the world, and their consequent ability to place promptly in the field great masses of troops, the difficulties surrounding the getting of information concerning the enemy's movements have increased. With a large and efficient cavalry force it seems clear that great opportunity under these conditions will be afforded the cavalry by reason of its mobility and efficient fire action, to not only obtain by independent action valuable information concerning the enemy, but to interrupt his movements and cut his lines of communication. The larger and more unwieldy the masses that constitute an army, the more dependent is the army upon its line or lines

of communication, and in consequence the greater the injury will such an army sustain when its flow of supplies is interrupted or cut off.

The richest field for the tactical activities of cavalry, is the pursuit. Once the enemy is severely defeated and driven back in anything like disorder, the cavalry should pursue aggressively and relentlessly. Then it will find that the opposing infantry, which when unshaken it would be suicidal to attack, is, in disorganized column of retreat, a vastly different foeman. The mobility of the cavalry then enables it not only to make and hold close contact with the enemy's rear guard in an effort to push through, but also to parallel the retreat, perhaps on other roads, and to cut in on the disorganized column. The individual infantry soldiers, when constituting an organization deployed for attack or defense have little fear of the cavalryman and his horse. When, however, they are intermixed on the retreat on congested roads, with men of other organizations and other arms, and with horses, wagons, teamsters and other fugitives, they realize the impotence of disorganization and dread the thunder and clatter which announces the impending charge of hostile cavalry. With the remarkable perfection of military

methods of organization and the ability of a well-trained force to bring order out of apparent chaos within a reasonable time, it is essential that the victor, if he is to reap the full fruits of victory, should follow his tactical victory by such aggressive operations as will not permit the enemy the time or the opportunity to effect reorganization. Any combat that results in the decisive defeat of a well-trained army will frequently have required of the victorious forces such sacrifices and exertions, that they are physically unable to immediately follow the victory with the aggressiveness of pursuit essential for the purpose mentioned. Then it is that the cavalry, which in most cases will not have participated in the trying ordeals of the main combat, should initiate and conduct the operations demanded by the situation. The ideal in cavalry operations of this character is illustrated by the Union cavalry under Sheridan at Five Forks, Virginia, in 1865, when they succeeded in getting around Lee's army and blocking its further retreat.

No reference to the cavalry arm would be complete without some comment on the losses in horse flesh occasioned by war. In the war of the Rebellion this wastage was influenced materially

by the fact that the cavalry consisted in the beginning largely of untrained men who had little previous knowledge of the use and care of riding horses, and from the lack of trained cavalry officers to instruct the men and to minimize the effect of their shortcomings. It is reported that when the war was at its height during the fiscal year ending June 30, 1864, the Federal Government purchased 188,718 horses and captured from the enemy more than 20,000. During that period the army required 500 horses a day to replace losses. These losses for the most part were not losses in battle, but losses which resulted from the breaking down of the animals on account of hard riding, improper care and lack of forage. Emaciation, sore backs and epidemics contributed their inroads.

In Napoleon's advance on Moscow in 1812, he took with him about 187,000 horses, of which about 60,000 were cavalry animals. Due to improper food and wet weather there was a great mortality among these animals in the early part of the campaign. Few of them lived to take part in the horrors of the retreat from Moscow. As a matter of fact more than 90,000 horses perished before the first fall of snow, and the remainder were

decimated in foraging operations about Moscow. When the French army, at the conclusion of its retreat recrossed the Niemen, less than 2,000 cavalry horses survived.

CHAPTER XIII

ARTILLERY

The artillery used with the mobile army is called field artillery, as distinguished from fortress or coast artillery. The artillery used in fortresses and for the defense of harbors consists mainly of great guns installed in permanent positions, although for local defense light guns which may be moved about on wheels, are also provided. There are various classes of field artillery.

These include the type generally called light artillery. The function of the light artillery is to accompany the mobile forces in all their daily work in campaign, to cover with their fire the attacks made by such forces or to stiffen in like manner their defense against attack of the enemy. In other words light artillery must have extreme mobility, as well as power, range and rapidity of fire. The desire for power and range tend to increase the weights of gun carriage and ammunition, while the requirements of mobility place limits on these factors. Hence it is that light

artillery is in a measure standardized throughout the armies of the world. The light artillery gun usually throws a projectile weighing approximately fifteen pounds, while the gun itself usually weighs 800 to 900 pounds, and are grouped four or six to a battery. The battery is an organization composed of the guns, the necessary number of vehicles for carrying ammunition, usually called caissons, the animals to transport the vehicles and the personnel to serve the guns, drive and care for the animals and attend to the auxiliary functions of reconnaissance, administration and supply. The battery is usually composed of from 100 to 200 men and approximately the same number of horses. As the gun carriage and caisson must be heavy enough to withstand the rough usage of campaign and to carry the heavy weight of the gun and ammunition, it is usually pulled by six animals. The carriage complete usually weighs about two tons, and this weight distributed among the six horses, places a traction burden on each animal of approximately but 650 pounds.

Compared with the weights pulled by draft animals in civilian work this burden of the artillery horse seems light, but it is to be remembered that the field artillery horse must possess in addition

to endurance and pulling qualities, speed and agility. In campaign, furthermore, he is frequently required to make long, fatiguing marches with short intervals of rest and with improper and insufficient forage. Much of the field artillery of the armies of the world is organized into light artillery commands of the character described.

It is said that field artillery was first used in the battle of Crécy in the year 1346. The use of Field Artillery in the modern sense resulted from the invention of gun powder, but prior thereto the ancients employed what corresponded to artillery. Their weapons of this character were the ballista, the catapult and springal. The ballista threw projectiles of stone from a wooden bucket, the propelling power being a spring. The catapult and springal were gigantic crossbows, which threw similar missiles. It is stated that the largest of these devices could throw projectiles weighing over five hundred pounds a distance of more than a thousand yards. While this is doubtless an exaggeration, it is clear that in the investment of castles and fortresses, the ancients did throw heavy missiles considerable distances with these appliances.

The earliest Field Artillery guns were called

bombards, and resembled somewhat the old fashioned mortar, which was a short gun of large caliber designed to throw projectiles high into the air with a view of dropping them vertically on the target. One of the earliest big guns was that of Mahomet II. Its bore had a diameter of "12 palms," and it propelled a stone ball weighing about six hundred pounds. It required two hundred men and sixty oxen to transport this weapon.

Field Artillery was used extensively in the wars of King Francis I of France, and Charles V of Germany and Spain. In those wars the guns were of many calibers, but the most effective was the so-called culverin which threw a projectile weighing about eighteen pounds. The lighter pieces were known as falcons and falconets. Artillery at that time, however, lacked mobility. The guns were moved about by hired teams and teamsters. They lacked discipline and precision. The result was that when the army was compelled to retreat, the guns usually fell into the hands of the enemy.

The French officer, de Grebeauval, is considered to be the father of modern field artillery. He was charged with the re-organization of the French artillery about the year 1762. He improved the material in many ways, looking to greater mobility

and increased range and power. The horses were harnessed in pairs, as is the custom at the present time, but the objectionable system which provided for hired civilian drivers was continued. It was Napoleon, however, who developed the tactical use of field artillery. He said himself, "It is the artillery of my Guard which decides most of the battles; because, having it always in hand, I am able to use it whenever it is necessary." Napoleon's battles furnish numerous examples of the daring and effective use of field artillery. The importance of field artillery has increased since the Napoleonic era with the development of science generally.

The ability of the German Army in August of this year to overcome the powerful defenses of Liège illustrates forcibly that the modern army cannot succeed in battle without an efficient, numerous and powerful field artillery, and on the other hand, that possessing such artillery, it can sufficiently break down any defenses to enable the infantry to successfully assault.

With the development of the field artillery, it became apparent that several classes of guns were necessary. Where for example a large force of cavalry was operating in front of the advance

of an army for the purpose of screening its movements, it was found that the fighting power of the cavalry would be greatly augmented by the addition of field artillery. This resulted in providing for the cavalry a special type of field battery. In order to provide the mobility necessary for the battery to accompany the cavalry, the cannoneers who ordinarily rode on the chests of the carriages were individually mounted on horses. The guns and carriages were structurally lightened. This type of field battery exists to-day and is known as "Horse Artillery." Generally speaking its tactical use and the technical control of its fire are similar to the methods employed in the light battery. In like manner it was found that when an army met the enemy entrenched in a strong position behind earthworks constructed at leisure, the light artillery batteries were insufficient in power to be effective. Several types of larger and heavier guns were therefore developed for the special purpose of breaching or destroying such works. These guns were known generally as heavy field artillery or siege guns, and included not only heavy rifled cannon but also howitzers and mortars. Howitzers and mortars differ from the ordinary type of field artillery in that they

are specially designed for what is called high-angle fire; that is to say, for throwing projectiles high into the air with the object of having them fall on the target from above, rather than to strike them horizontally from the front. These heavier types of field guns, owing to their weight and to the increased weight of the carriages which bear them, lack mobility. They are, however, drawn in the rear of the army either with draft animals or by traction engines, and are not brought up until the occasion for their use arises and the way is prepared for their movement to the front.

In addition to the types of guns already enumerated, most of the modern armies include the type known as the mountain gun. It was found that in mountainous districts where the roads consisted of trails, it was frequently desirable in combat to have artillery accompany the infantry troops. Wheel transportation being impractical in such terrain the mountain battery was developed to fulfil the requirements of mountain warfare. Mountain guns are so constructed that they can be dissembled and the parts carried on pack mules. The gun is carried by one mule; the small wheels by another; the cradle and trail by a third, while additional mules carry the necessary

supply of ammunition. Such batteries are usually officially designated as mountain batteries, while the soldiers call them mule batteries, jack-ass batteries or "hee-haw" batteries. The personnel are usually specially selected for height and strength, in order to raise with facility the guns from the ground and pack them on the mules. Various devices and types of pack equipment are in use in the various armies for the purpose of carrying the load in such manner that the mule may travel with as little inconvenience as possible. A good mule can carry in campaign from 200 to 250 pounds, although for short distances and short periods they can carry much greater weight without injury. Mountain guns are now used in very much the same manner as are the light artillery guns.

In the United States service horse batteries are identical with light batteries so far as the *materiel* is concerned, the only difference being that the cannoneers are individually mounted instead of riding on the gun carriages. This lightens the load behind the horses and provides the additional mobility necessary for horse batteries to possess in order to accompany the cavalry in their operations. The technical control of their fire is simi-

lar to that prescribed for the light batteries. An explanation of the system of fire control now used in the light artillery service of all the great powers will, therefore, serve to illustrate the present day control of field artillery fire generally.

The development of field artillery is marked by stages based on the introduction of new devices or inventions, which made necessary radical changes in the use of field artillery. The invention for example of the rifled gun, enabled field artillery to discard spherical shot and use the present day cylindrical projectiles having ogival heads. Rifling, gives the projectile, in leaving the bore of the gun, a rotary movement on its long axis which prevents it from tumbling during its flight. The flat base of the cylindrical projectile offers a better surface for the propelling action of the expanding gases of the gunpowder explosion than did the convex surface presented by the spherical shot. This greatly increased the range of field artillery and marked a stage in its development. The invention of the breech-loading gun and of the modern shrapnel further increased the power and effectiveness of field artillery and marked other stages in its development. About fifteen years ago the French developed

what is known as the long recoil type of field gun and at the same time introduced a new system of indirect fire control. This type of gun and system of fire control have since been adopted in the leading armies of the world. They constitute a remarkable advance in the development of field artillery. It is this present stage in the evolution of field artillery which will now be explained.

Prior to the introduction of the present type of long recoil guns, it was necessary to relay the piece after each shot. The recoil of the gun was such that the gun carriage rolled back several yards although appliances were provided for "braking" the wheels. The manual labor of pushing the gun forward to its original position and giving it proper direction and elevation, consumed time and limited the number of aimed shots which could be fired per minute, to about four. The so-called long recoil type of gun is so constructed that when fired, the carriage remains rigid and the gun recoils on a supporting frame or cradle through the action of a recoil cylinder about equal in size and diameter to the gun itself. When the gun recoils, it carries with it a piston rod and piston which compress powerful steel springs within the cylinder. The energy of recoil is, therefore, neutralized by

the power of the springs and also by the resistance of oil or air forced through the piston, from one part of the cylinder to the other. When the gun reaches its maximum recoil which is about four feet, the springs in expanding, return the gun to the firing position, and the oil or air forced through the piston in the movement of recoil operates as a buffer or check against the gun being forced back by the springs to the original firing position with too much force. Thus it is practicable for the gunner and cannoneer immediately concerned with manipulating the instruments controlling the fire and which are affixed to the carriage, to perform their functions while seated behind the protecting steel shield on the carriage without leaving those positions when the gun is fired.

Light artillery projectiles are now made up as fixed ammunition, and resemble in appearance giant rifle cartridges. They may therefore be handled without the danger incident to the handling of the old type of field artillery ammunition, where each charge consisted of the projectile which was first inserted in the breech and forced into place with a short rammer staff, and of the propelling charge of loose powder contained in

a cylindrical bag, placed behind the projectile. A smoldering fragment of the bag of the previous charge sometimes caused the premature discharge of the succeeding charge. With the fixed ammunition such accidents no longer occur.

With the old type of gun it was necessary, on account of the recoil, for the gun detachment to stand clear of the gun carriage when the gun was fired, which was done by means of a lanyard fixed to a friction primer inserted in the breech-block. When the lanyard was pulled by the cannoneer, it exploded the primer which communicated its flame through a vent in the breech-block to the propelling charge in the chamber of the gun. The new type of gun is fired as a rifle is fired, by a trigger pulled by a cannoneer from his seat on the carriage. With the new type gun, a rapidity of fire of from 12 to 20 shots per minute is practicable.

But the most important development in the new gun is the sight and quadrant whereby the gun may be directed so as to hit the target, without the gun being in a position from which the target can be seen. When the great money value of a battery of field artillery is considered, and to this is added the value of the horses, the length of time

Photograph by American Press Association

The modern army has found no more useful auxiliary than the armed and armored aeroplane

it takes to manufacture the *materiel* and to train the gunners, drivers and cannoneers, it becomes apparent that any scheme which will tend to safeguard the battery from the enemy's fire is desirable and important. If the battery therefore in delivering its fire, could occupy a position on the reverse slope of a ridge or in or behind a corn field or woods, it is evident that the chance of the enemy locating and hitting the battery would be greatly lessened. Until the introduction of the new system of fire control however, a battery which occupied such position, while it would be more or less safe from the enemy's fire, would not be able on its own part to deliver effective fire against the enemy.

Perhaps the best way to describe how this is now accomplished is to assume a battery so located and describe what is done by those concerned in directing the fire of the battery from such masked position. We will assume that the battery is behind a ridge and on the edge of a corn field most distant from the enemy. Standing behind the four guns and looking to the front we can see nothing but corn which rises above the heads of the gunners and cannoneers. The horses and limbers have been driven off and are under cover

of a deep draw on a flank of the battery. Standing on one of the guns and looking to the front over the top of the corn we can see nothing but the sky line of the ridge in our front. Being thus unable to see anything of the enemy let us follow the captain who is to conduct the fire of the battery against the enemy's position four thousand yards on the other side of the ridge, and to the front of the battery. We find him perhaps a quarter of a mile off to a flank of the battery. He is standing behind a clump of bushes on a spur of the same ridge behind which the guns were placed. With him is one of the lieutenants of the battery, who is known as the reconnaissance officer, and there are also present a sergeant and several privates. One of the latter has a telephone instrument, the receiver of which is attached to his head. He is sitting down under cover, and from the little portable battery box and transmitter in his hands we note a wire running loosely over the ground toward the battery. On inquiry we learn that at the other end of the wire there is another soldier provided with a field artillery telephone, and that these men and their instruments constitute the means of communication between the captain and his firing battery. The captain tells us

that his station is known as the battery commander's station; that the instrument which he is operating and which resembles a transit is known as a battery commander's telescope, and is in fact an instrument designed for the measurement of horizontal and vertical angles. It is graduated in the same manner that the panoramic sights on the guns are graduated, except that one is read clockwise and the other counter clockwise. The captain, having determined the target and estimated or measured the range thereto from his station, selects what is called an aiming point. This aiming point is any well defined vertical object on the horizon, preferably at a distance of more than two thousand yards, which can be seen, not only by him but also by the four gunners of his battery through their panoramic sights on the guns. It is evident that possessing a sight which can be rotated through the complete circumference of a circle, the angle contained between two lines having as their vertex the sight, the one line running through the target and the other through the aiming point, can be measured on the scale provided on the sight for that purpose. By setting the sight at that angle, and giving the gun such direction that the vertical cross-wire of the sight

is coincident with the vertical aiming point, the gun will be pointed in the direction of the target. The difficulty in measuring the angle at the gun itself is due to the fact that the intervening mask, in this case the corn field and ridge, make it impossible to see the target from the position of the gun. At the battery commander's station, however, this difficulty does not exist. The captain may see the target, the battery and the aiming point. Hence with his instrument he quickly and accurately measures the angle between lines drawn through the aiming point to his position, and through the target to his position. This angle will differ in its value from the angle having the gun as its vertex, by the equivalent of the displacement of his position from the gun. Various formulæ and short cut methods have been devised for the determination, at the battery commander's station, of this angle at the gun. The angle is known as the deflection. The same instrument which measures the horizontal angle, also measures the difference in elevation between the plane of the guns and the plane of the target, and this difference is called the angle of site. This angle and the range in the indirect system of fire, are laid off on the quadrant attached to the gun.

When the quadrant is properly set with the range and angle of site indicated, the cannoneer charged with the adjustment of that instrument, by turning the elevating lever depresses or elevates the muzzle of the gun as the case may require, until a longitudinal spirit level on the quadrant is properly bubbled. When this is done, assuming that the quadrant has been transversely leveled, it means that the gun has the proper elevation to deliver the projectile to the target. In similar manner the deflections of the other guns will vary by the extent of their displacement to the right or left of the directing gun, and by changing the value of this deflection difference, the fire of all four guns may be controlled by the battery commander from his distant position, in such manner that the sheaf of fire may be converged on one point of the target or opened up and distributed over the full front of the target. In like manner by telephoning an order to add to or subtract from the deflection, he may shift the entire sheaf of the battery's fire from right to left or from left to right, and by varying the range or angle of site may raise or lower the sheaf of fire. Thus the fire of the modern battery may be likened to the stream from a powerful fire hose

mechanically controlled from a distance. By pulling one lever, the stream of water may be swept to the right, and by pushing the lever back the stream may be swept to the left. By another lever, the stream may be raised or lowered and by other levers the nozzle may be so operated as to change the character of the stream itself, now widening it out into a spray and now concentrating it in full force and volume.

Attached to the bodies of the caissons which stand alongside of the guns are mechanical devices for setting the fuses of the shrapnel. The shrapnel fuse is a clever mechanical device screwed into the nose of the projectile and designed to cause it to explode at a designated point in its flight, or on impact. It should be noted that the shrapnel, known as the man killing projectile, is designed primarily to be burst in the air and in front of the target, so that it may, when exploded, drive its charge of more than two hundred balls against the target. The best results from the shrapnel are obtained when it bursts about fifty yards in front of the target and at a height above the target depending upon the range. This, roughly, is about ten feet for every thousand yards of range. The striking power of the shrapnel balls therefore

consists of the remaining velocity of the projectile at the moment of burst, plus the additional velocity given by the bursting charge within the shrapnel case. The fuse consists of a time train which burns at a uniform rate of speed after it is ignited. When the range to the target is designated, that range is set off on the instrument known as the fuse setter, and the nose of the projectile which consists of the fuse, is set into this instrument by one of the cannoneers and turned in such manner that a dial on the fuse sets off the number of seconds and fifths of seconds which it will take the projectile to travel from the muzzle of the gun to the point where it is desired that the shrapnel burst. The turning of the dial has the effect, mechanically, of determining the length of the time train.

Now as to the manner in which the time train is ignited. It is interesting to note that many persons believe until the device is explained, that the time train is ignited by the flame from the propelling charge behind the projectile. The fuse, however, is in the nose of the projectile, and around the base of the projectile is a rotating band designed for the purpose not only of enabling the projectile to readily receive a rotary movement

from the rifling, but also of acting as a gas check against the escape of the gases of the explosion between the projectile and the walls of the bore of the gun. No flame therefore could reach the fuse. The time train is ignited by the self-contained action of the fuse. When the gun is fired and the projectile is suddenly started in its flight, the shock dislodges a plunger provided for the purpose within the fuse, and this plunger immediately comes in contact with fulminate of mercury, causing a flame which communicates with the time train at the point indicated. The time train continues to burn until the termination of the designated number of seconds and fractions thereof, at which time it reaches the bursting charge in the base of the projectile. This thereupon explodes and blows out of the case the shrapnel balls toward the target. These shrapnel balls in most projectiles of this character are now welded into a matrix of tallow and resin, which, consumed by the great heat of the explosion, gives off a white smoke. This serves to aid the officer conducting the fire in readily spotting the shots and making whatever corrections are necessary. In addition to the shrapnel, the light batteries are provided with high explosive shell. Shrapnel are used

against men and animals and shells against material things such as villages, intrenchments, redoubts, etc.

It was originally believed that the system of indirect fire was complicated, capable perhaps theoretically of great accomplishment, but not practical under the conditions of campaign where everything to be effective must be simple. It was urged by the opponents of the French system that it was too mathematical and complicated and that in combat it would be necessary if effective assistance was to be had from the field artillery, that they run their guns up on the hill tops as they did in past wars and while hammering the enemy take such punishment as fell to their lot. Extensive experiments and experience with this system, however, have served to convince most officers that it makes for greater certainty of fire than was possible under the old system, and that this is true because of the elimination in large measure of the personal equation of the enlisted man. Under the new system it will be noted that the firing battery is more apt to be removed from the stress and excitement of combat than was the battery under the old conditions. The gunner now is no longer a man upon whose expertness, eyesight,

judgment and skill depends the efficient fire of the gun. Not only the gunners, but the entire gun crews, now resemble the engineers, oilers and stokers in the bowels of a battleship. They are performing important mechanical work, but only indirectly are they participants in the fight. They are not normally seen by the enemy, nor do they in turn see the enemy. Just as the engine room force aboard the battleship carry out the orders telephoned to them from the conning tower, so do the field artillerymen, masked behind some natural obstacle, carry out their mechanical duties pursuant to orders telephoned to them from the battery commander's station. Where under the old system it was necessary to point out the target to all four gunners and to make sure that the same was identified by them before the captain could undertake to fire his battery, under the new system nothing is pointed out to the gunners and the captain shifts the fire of the guns at will about the battlefield within the limits of the range, by telephoning to the battery the necessary changes in the firing data. Under modern conditions the field artillery personnel with the guns do not even know what they are firing at or the results of their fire, unless the captain deems it desirable in

intervals between firing to give them information of results.

As explained in the chapter on Infantry, infantry fire in defense is ordinarily so effective that the attacking infantry cannot by its own fire alone reasonably expect to sufficiently demoralize that of the defenders to make a successful advance possible. Attacking infantry must have the support of their own field artillery fire. The mission of the field artillery in supporting the infantry attack, is to fire over the heads of the advancing infantry against the defenders' positions, and by the accuracy and volume of the fire, to inflict such casualties or to so demoralize the defenders that their fire against the advancing infantry becomes ineffective. The function of artillery in the defense is to aid its own infantry in throwing back the advance of the enemy's infantry. This it does by shattering the advancing forces with shrapnel fire. From this it becomes obvious that the artillery, in addition to these functions, should seek to silence the fire of the artillery of the opponent, and under normal conditions of battle this is usually attempted. The artillery of the attacker, when the opposing artillery opens on the advancing infantry, seeks to locate and destroy,

or at least to silence, the batteries thus interfering with the infantry advance. For the purpose of distinguishing batteries firing on opposing artillery from the batteries firing on the enemy's infantry, the former are called counter batteries and the latter infantry batteries. The same comment applies to the functions of the artillery of the defender. Part of the defender's artillery is employed against the advancing infantry and part against the opposing artillery. It should not be understood by this that batteries of artillery are permanently designated as counter batteries or as infantry batteries. They may act now in one capacity and again in the other. All the artillery on one side may concentrate its fire against the opposing artillery, or when necessary its entire power may be delivered against the opposing infantry. The decision is based on the tactical necessities of the moment.

Where the infantry attack is successful and the enemy's position is assaulted and captured, some of the attacking artillery is promptly advanced to the new position to aid in repulsing any counter attack that may be made by the enemy for the purpose of regaining the position.

Military opinion holds the view that the rôle of

the field artillery is of increasing importance on the modern battle-field. This opinion appears to be borne out by the reports which come to us of the activities of the field artillery of the armies now engaged in the war in Europe.

CHAPTER XIV

AUXILIARY SERVICES

As civilization has advanced, the organization of armies has become more complicated. Many of the activities necessarily performed by armies are so technical in their nature, that special bodies of troops have been formed for the purpose of rendering service more or less technical in its character. Thus we find in the organization of a large army, aviation organizations, signal troops, engineer troops, sanitary troops and supply troops.

Aviation is the newest field of military activity, and the present war in Europe presents the first real opportunity for determining the value of air-craft as military assets in war. These aerial craft consist of free balloons, captive balloons, dirigibles, aeroplanes and kites. In the American Civil War, in the Franco-Prussian War and in subsequent conflicts the balloon was frequently used. The free balloon, although subject to the caprices of the prevailing wind, was used with

success in carrying passengers and information from beleaguered cities to friendly territory. The captive balloon was more frequently used in the military service. It consisted of a balloon, containing one or more observers, attached to a cable which was played out over a windlass until the observers had arrived at a height sufficient to enable them to make what observations were desired or were possible under the conditions. Free balloons and captive balloons were comparatively safe when struck by hostile rifle shots, as they usually settled to the ground slowly and in such manner as to enable the occupants to escape without injury. Owing to the necessity for captive balloons to be sent up at a point far enough distant from the enemy's lines to avoid destruction, it was difficult for the observer, even with powerful glasses, to learn much that was desired concerning the movements or dispositions of the enemy.

In the Santiago campaign in the Spanish-American war, the United States forces sent up an observer in a captive balloon. The appearance of the balloon was the signal for the enemy to turn upon it a heavy fire. Many of these shots fell among the troops on the trail below the balloon

and many casualties were in consequence inflicted on them. It is said that the only information furnished by the observer was that the enemy was in the distance and was firing in his direction—information which the troops below had already received in convincing form.

With the remarkable development of aviation during the past few years, the reader is doubtless familiar. Of the military value of air-craft, opinions differ. The dirigible is self-propelling and capable of carrying a considerable number of passengers. It is reported that some of the German dirigibles have carried more than two score of persons. These air-craft, however, because of their immense size, present a large target to hostile fire; they are costly, and although recent reports have it that the German Government has developed a non-inflammable gas, the reports have not been authenticated, and its liability to explosion appears to remain a serious defect. To avoid hostile fire, it must therefore seek a great altitude, and this minimizes its value as a scouting machine. The Germans have developed the dirigible to a greater extent than have any other people, but they have not neglected the aeroplane as a military air-craft.

The aeroplane is believed to be the best air-craft for military reconnaissance. It has been developed for military purposes more particularly by the French. Owing to the speed and size of such craft, they furnish extremely difficult targets for hostile fire, while their comparatively light cost makes it practicable to sacrifice a percentage of them in order to obtain important information concerning movements of the enemy at a critical time. Public interest in the dirigible and aeroplane seems to be centered on their bomb dropping qualifications. The military mind is more interested in their value as eyes of the army. Prior to the present war in Europe, military opinion discounted the popular belief concerning the amount of damage which could be done by air-craft in time of war, and the reports coming to us from Europe seem to support this view. To illustrate the ground for this military opinion, let the reader compare the damage that can be inflicted on a city by half a dozen aeroplanes, with the damage possible of infliction by the guns now used in bombarding fortified towns. Assuming that the aviator can carry, in addition to his own weight, two bombs weighing fifty pounds each, it will be necessary for him, in order to drop them within the

hostile city, to make his ascension well without the zone of hostile fire, to describe the necessary number of circles in order to attain a height necessary to avoid destruction and then to speed over his target and drop his missiles. All this involves the great risk of accident inseparable from aviation, plus the increased risk imposed by the conditions of war. The dropping of the bombs is in itself difficult, and because of the altitude there is little certainty that they will strike an important target. It is known furthermore that the effect of such explosives dropped in the manner indicated is entirely local. If the aeroplane is destroyed and the aviator killed, we have the loss of a costly machine and a trained man as a result of an effort to drop a few shots in a hostile city. While it is true that dirigibles can transport a greater number of heavier and more powerful bombs, its dropping accuracy is less than that of the aeroplane, because of the greater altitude in which it must operate on account of its bulk. Furthermore, the time of the voyage to make delivery and of the return trip would be much greater than that of the aeroplane, while its destruction and the loss of its crew would far outweigh any success based upon the accomplishment of its mission.

Compare these insignificant results with those obtained by modern siege artillery. It is reliably reported for example that at Liège the Germans employed fifty howitzers which are said to throw a 700 pound projectile. While the rapidity of fire of these guns is perhaps considerably faster than one shot in five minutes, let us assume that rate of fire for a short period. Thus while it would take an air-craft, whether aeroplane or dirigible, several hours to "tune up," attain the necessary altitude, travel to a point above the objective, drop its projectile, return, and make its descent, the fifty siege howitzers in a brief period of fifteen minutes would have delivered into the hostile city 105,000 pounds or more than fifty-two tons of high explosive projectiles. As an offensive agency, the existing air-craft are not to be compared with modern heavy field artillery. For offensive purposes their only apparent superiority lies in their moral effect and the ability to exceed in their flight the trajectories of artillery guns. They might deliver missiles into a fortress or other defensive position which could not for some reason be approached by the artillery.

The human mind is always more fearful of the unusual and the unprecedented than it is of any

other form of violence, although the former may actually be less harmful. The savage is more afraid of the panting locomotive than he is of a really harmful wild beast, while with the civilized man the converse is true. So it will probably be found that the damage done by air-craft in the present war, other than the demoralization spread by their appearance, has been greatly exaggerated.

The importance, however, of air-craft as agencies for obtaining information concerning the enemy probably cannot be overestimated, and especially is this true of the aeroplane on account of its speed and size. It has been pointed out that in campaign the military commander has always been more or less mystified by the great number of rumors and reports which reach him concerning the actual or threatened activities of the enemy. The features of the ground in his front and the enemy's out-posts serve as a curtain or screen behind which it is often impossible to penetrate. Much of this difficulty it now appears is obviated by the use of aeroplanes, particularly when the information desired concerns a reported movement of large bodies of the enemy's troops. The aeroplanes seek from above the same inform-

ation which the cavalry of the army is seeking below. There is, however, another function which the cavalry has which the aeroplanes cannot perform. The function of cavalry is not only to aggressively press forward, locate and report the movements of the enemy, but to prevent the enemy's cavalry from obtaining like information concerning their forces, by driving back the enemy's patrols and detachments and keeping them without the range of observation. The aeroplane is incapable of performing this latter duty, and hence its function is in a way merely auxiliary to that of the cavalry. It is organized as a separate corps only because of its technical and mechanical differences.

The signal corps of an army is charged with the maintenance of communication between the various units which compose the army. It employs all the commercial devices which have application to the military service. The earliest messages were conveyed over a distance either by runners or by signal fires. The invention of the electric telegraph was the first big step in the development of military signal work. Prior to that time messages were largely conveyed over long distances by flag signals during the day and torch

or lamp signals at night. After the field telegraph was developed and had well and faithfully served many armies in campaign, the field telephone was developed, and to-day we have wireless telegraphy or as it is called in the military service, radio communication. The practical use and application of the various means of military communication are illustrated in the last two chapters under the heading of "The Combined Arms in Battle."

So far as engineer troops are concerned, perhaps their most characteristic work with the mobile army in campaign, is the construction of bridges over or across rivers. There are many types of bridges capable of hasty construction by well trained engineer troops. It frequently happens, however, when the necessity arises to throw a bridge across a stream that there is not immediately available sufficient timber or other material for the purpose. The engineer troops attached to an army in campaign, therefore, usually include one or more battalions of pontoniers. These troops are accompanied by wagons carrying heavy boats, the shape of scows, called pontons, together with the necessary timbers and flooring with which to construct a bridge

of reasonable length. In the United States service the pontonier battalion of engineers carries material for 186 feet of bridge. In the construction of the ponton bridge a ponton is securely anchored in the stream at such distance from the bank as will permit the supporting timbers of the floor to securely span the space between the bank and the ponton. As the floor is laid on these timbers, the next ponton is being placed in position, connected by its floor timbers with the first ponton, and properly anchored. As the flooring is laid out to the second ponton, the third is being placed as were the preceding pontons. In like manner the construction of the bridge is continued. The men are so trained that every man knows his particular function, and the bridge is constructed with great rapidity, and when complete, furnishes a substantial means for the crossing, not only of infantry soldiers, but of artillery, cavalry and loaded wagons.

There are many types of streams, however, where the use of the ponton bridge would not be advisable. The ponton bridge should be reserved for use over streams which cannot readily be bridged with timber and material available on the site. The capacity and strength of the bridges

naturally depend upon the traffic requirements. If the bridge to be constructed is not to be used by loaded wagons or artillery, it may be more lightly and rapidly constructed than if its requirements included the demands made by the heavier weights. Water tight barrels are sometimes used as floats for bridges. Where the span is short the cantilever bridge is frequently used, provided the load requirements are not too great. Another form of bridge is the truss type. The truss is a compound beam which supports the weight, and the parts of which are so disposed as to form one or more triangles in the same plane. The suspension bridge is also used under certain circumstances. In this type of bridge the roadway is hung on two or more cables stretched from bank to bank, the ends of the cables being attached to fastenings called anchorages. The cables are allowed to sag in order to lessen the tension. On the other hand the greater the sag the greater the vibration. For field bridges a sag of one-tenth the span is considered sufficient. This type of bridge is well adapted for long spans and light loads.

Engineer troops are charged with the repair of damaged roads where the use of such roads is required for the movement of troops or supplies.

They are frequently charged with the construction of new roads for the same purposes. Whenever possible their forces are augmented by civilian labor. Their work includes the repair of railroad lines which may have been damaged by the enemy and which are required for the use of the army. Conversely the engineer troops frequently supervise the destruction of railroad lines where such destruction is made necessary during military operations.

When maps of the theater of operations of an army are not available, the engineers are charged with the preparation of such maps. At times maps will be available, but they will not meet military requirements and such maps must be supplemented in such manner as to indicate the features of the terrain which concern the army in campaign. In addition to this general map work, engineer officers and their troops are often called upon when a battle is imminent to take part in reconnaissances, for the purpose of making military sketches and maps indicating the nature of the foreground over which the army will have to advance, the cover and artillery positions available and the location of the enemy's positions.

When an army resorts to field fortifications in

the conduct of defensive operations, the construction of intrenchments, redoubts, entanglements and block houses is carried out under the supervision and with the assistance of the engineer troops. The construction of land mines and the military demolition of objects in the theater of war which are unfavorable to the army or favorable to the enemy, are also conducted by the engineer troops. Combined with this great diversity of engineering and mechanical work the engineer troops are frequently called upon to fight as infantry.

The supplying of troops in the field with all the material things necessary for them to have is so technical that special troops are organized for the purpose of performing supply functions. In the United States service the duties which pertain to the supply of troops, to their subsistence and pay, and to the furnishing of forage for the animals, are performed by a corps known as the Quartermaster Corps. This corps is charged with the preparation of permanent camp sites, with the construction of military buildings, the purchase of mules, horses and wagons and various classes of military equipage and equipment, as well as rations and forage. Their duties include the trans-

portation of supplies to the troops, as they are required. The corps is charged with supplying transportation, not only animal and motor, but rail transportation as well. In addition to the corps of officers and enlisted men whose duties are general in their application to the mobile forces, there are special officers and enlisted men in the several organizations who are charged with local supply functions. When the old maxim "that an army moves on its belly," is remembered, the importance of the Quartermaster Corps to the general efficiency of an army in the field becomes apparent. The manner in which supplies are forwarded from the base and finally reach the individual men in the field, is illustrated in the chapters on "The Combined Arms in Battle."

The medical department of most armies has been greatly developed during the present generation. Not only are the medical officers now concerned with the relief of the wounded and of those stricken by disease, but what is even more important, they are largely engaged in the prevention of disease. It should be remembered that in war more men have died as a result of disease than were killed in action or died as a result of wounds. In the Spanish-American War on the

American side, 243 men were killed in action or died of wounds, while 2,569 men died of disease. In the Boer War, on the British side, 7,702 men were killed in action or died of wounds, while 13,250 men died of disease. Occasionally in warfare the number of killed and those who die as a result of wounds exceeds the number of deaths by disease, but in the grand total of the victims of war, it will be found that the latter class exceeds the former. Much has been accomplished by the medical corps in lessening the number of deaths from disease by preventive measures. Typhoid, which has always been peculiarly a military or camp disease, has practically been eliminated as a result of the introduction and use of Typhoid Vaccine.

Much progress has been made in determining the causes of disease and identifying carriers of disease. The fly and the mosquito are now recognized as agents for the communication of disease by infecting food and contaminating the blood. Means are now accordingly adopted to lessen the activities of these insects and to screen the soldiers from them whenever possible. Great attention is now given to the care of the soldiers' feet. In the Franco-Prussian war one of the Ger-

man army corps suffered a loss of nearly ten per cent of its strength due to sore feet, and at one time the German army had as many as 30,000 men disabled in this manner. In the modern army the selection of foot gear is no longer left to the whim of the individual soldier. Marching shoes have been designed after many experiments and trials, and much care is exercised in fitting the shoes to the feet of the wearers.

Every soldier going into camp is now provided with a sanitary compress and bandage contained in a hermetically sealed packet which he carries attached to his cartridge belt. In regimental organizations, there is a detachment of men known as the hospital corps detachment, who are specially trained in rendering first aid to the injured. The division is supplied with four ambulance companies. These companies, in combat, establish dressing stations and send out litter bearers to gather in the wounded who are unable to transport themselves. These receive such immediate attention as they may require at the dressing station and are then conveyed in ambulances to the field hospitals of which there are three to a division. The field hospital is supplied with every modern facility necessary for emergency operations. At

the field hospital, statistics are kept of the men, other than the killed, who constitute the casualties of the action. From the field hospital the men are transported at the first opportunity in wagons or ambulances to another hospital further towards the rear. From this hospital, known as the Evacuation Hospital, many of them are shipped to base hospitals or to convalescent camps. The functions of the medical corps include the inspection of camps, quarters and stables with a view to rectifying every defect which might be a cause of disease.

The operations of the sanitary troops in battle are explained in the chapter covering "The Combined Arms in Battle."

CHAPTER XV

SECURITY AND INFORMATION

Armies do not fight duels according to set rules and at a stipulated time and place. We have seen in the chapter on War that there are few limitations governing the conduct of armies in campaign. Other than these few limitations there are no restrictions, and the commander is expected in the conduct of his operations, to do everything that will increase his own chances for success and to leave nothing undone to place the enemy at a disadvantage. In consequence, armies maneuver so as to place the enemy on ground unfavorable to him. The military commander is ever alert to take his enemy at a disadvantage; for example, when he is crossing a stream, with part of his forces on one side and part on the other. It is the duty of the commander to embarrass his enemy by cutting off his water supply or destroying his stores, or cutting his line of communications. He employs spies to secretly obtain information of the conditions in the enemy's

camp, of the enemy's movements and proposed operations.

Success in war, therefore, depends not only upon the martial qualities of the opposing soldiers, their numbers, morale and armament, but upon the extent of the information known of the enemy. The obtaining of military information begins in time of peace. The General Staff of an army in time of peace makes every effort to acquire all possible information concerning nations with which its government may engage in war, and concerning the country in which the contending armies may operate. This information is systematically obtained, kept up to date, and filed away properly indexed, in the official archives. Some of the information is gathered by military attachés on duty with the governments of other nations. Other sources of information are books, professional periodicals and spies or agents charged with obtaining special information. The information sought includes the geography of the country, its resources, mineral and agricultural products, its exports and imports, its railways, military system, fortifications, finances and every other material item of information which would be of value in the event of war.

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English troops hastily deployed at a roadside. Note the rapid-fire gun in the foreground

It will therefore be seen that information may be divided into two classes; information obtained in time of peace, and information to be gained in time of war. The first class comes under the head of preparation for war, and has been discussed in the chapter devoted to that subject. Information of the second class is sought mainly for the purpose of aiding active operations of the forces in the field. As the obtaining of information concerning the enemy is necessary for the efficient action of an army, it is equally important that the enemy be denied similar information concerning the opposing forces. To prevent the enemy obtaining such information and to guard against sudden actions of the enemy which would place the army at a disadvantage, many tactical devices, methods, and even minor operations, are resorted to. All of these come under the head of security. As the duty of acquiring information concerning the enemy is so closely related to the obligation of providing for the security of the command these subjects are usually grouped together in any study of tactical operations, under the heading "Security and Information."

In active operations important information other than that acquired by the troops is usually

obtained from one of the following sources; from spies, friendly and unfriendly inhabitants, newspapers and captured mail. So far as spies are concerned they are usually civilians employed for that purpose, although occasionally officers have acted in that capacity where the information desired is not only important but of a nature requiring technical military knowledge to obtain. Shortly before General Nathaniel Lyon attacked the Confederate camp in the vicinity of St. Louis, Missouri, during the Civil War, he assumed a disguise and succeeded in visiting the camp and gaining much information of value to him in determining his plan for the attack. His attack resulted in the capture of the camp. Women have frequently proven to be very clever spies. In the Shenandoah Valley Campaign General Sheridan regularly received much valuable information from a woman residing within the Confederate lines. Spies frequently pose as venders, drivers and traveling comedians. Various ruses are on occasions resorted to to gain for the spy, admission to the inner circles of the enemy's army. At times, in order to accomplish this, spies have acted as double spies, that is to say, acting on behalf of one government they have succeeded in securing

employment in a similar capacity from the opposing government. There have been occasions when double spies have not played fairly with either employer. On the other hand some of them have rendered valuable service to one side while transmitting to the other only enough information to maintain the employment necessary for the carrying out of the real mission. Spies are usually well compensated and on the other hand many are frequently influenced to become spies by reason of injustice suffered by them at the hands of the opposing government. In view of the uncertainty in many cases of the dependence to be placed on the loyalty of a spy, it is the practise of those charged with the conduct of their operations, to keep them in the dark concerning all matters not essential for them to know. The identity of other spies in the employ of the commander is not divulged, and the reports received from other spies are not disclosed. Sometimes the reports received from one spy are checked against reports on the same subject received from other spies. Where the loyalty of a spy is not certain the practise is to transact business with him in the vicinity of an outpost so that he cannot by visiting and moving about freely within the camp, be in a posi-

tion to take back important information to the other side.

The newspapers published in time of war have in the past furnished much valuable information to the enemies of their country. During the Franco-Prussian War, when Marshal MacMahon began his march for the relief of Marshal Bazaine, the first information received by General von Moltke of this movement came to him from French and English newspapers. It is common knowledge that during the Boer War in South Africa the Boers repeatedly received valuable information which first appeared in English newspapers and thereupon was telegraphed to them. In the Spanish-American War, in similar manner, information concerning the plans and operations of the American forces was furnished to the enemy through the agency of American newspapers. The harmful activities of newspaper representatives are not of course intentionally disloyal or traitorous, but result from the effort to publish the news for the information of their own countrymen, in part from recklessness and irresponsibility of reporters, but more frequently from ignorance of the conduct of war and of the important influence which the smallest piece of information

may sometimes have on the operations of the enemy. General von der Goltz, who has been quoted elsewhere in this book, on this point said:

"Even the best informed paper will neither be able nor willing to make known the position of its party in all its entirety. But, even here, what is worth knowing is composed of many petty details. Other flashes of light have often so far lit up the picture of the enemy's doings, that only a breath of wind is still wanting to rend asunder the thin enshrouding veil of mist. The presence of a high commander is mentioned, a letter published, in which the writer mentions a division of troops and its station, or narrates a deed of arms, exactly describing all the circumstances, the regiments, and commanders. Each detail by itself is perfectly unprejudicial, but may yet serve as a valuable link of a chain that at last leads to its aim."

As a result of the activities of newspaper reporters and war correspondents, the leading governments within recent years adopted stringent regulations governing their conduct when accompanying armies in the field and supplemented these with others to limit military information to be published for public consumption. In the present war in Europe we see evidence that regulations of this character are being enforced by the combatant powers. Newspapers, however, are sometimes utilized for the purpose of disseminating false and misleading news in order to deceive

an enemy known to possess the means of obtaining such newspapers.

In operations which carry an army into the enemy's country it frequently happens that citizens of the invading government or others friendly to it, are found within the invaded territory, and valuable information concerning the enemy is often obtained from such sources. Information is sometimes secured from unfriendly sources—from hostile inhabitants, who do not realize the value of the information they are giving. Uneducated persons who have no intention of imparting to an enemy information which they regard as valuable, will often, in order to cover their reticence with plausibility, give correct information which they regard as of no value, but which, patched with information received from other sources, furnishes important clues concerning the intentions or operations of the enemy.

Information is obtained tactically, by reconnaissance. A reconnaissance is a troop movement for the purpose of obtaining information against the enemy. These are usually classified as reconnaissances in force, special reconnaissances and patrolling and scouting. A reconnaissance in force is usually a military operation of

some magnitude for the forces employed usually consist of all arms of the service. The operations are conducted as if the detachment were an independent command. A reconnaissance in force is usually made for the purpose of developing the location and strength of the enemy's forces. Frequently in war an enemy will screen his location so successfully that patrols and scouts are unable to penetrate the screen to determine whether the enemy is really present in force behind the screen or whether he has departed, leaving a holding force while he operates in another direction. The detachment of all arms charged with making the reconnaissance in force will usually attack the enemy vigorously and in a manner to lead him to believe that the army is attacking. In order to repel such an attack the enemy, if he is really present behind the screen, will have to meet the attack. This usually enables the development of his strength and dispositions or establishes the fact that the enemy's main body is not present.

A reconnaissance in force is however a costly method of securing information for the reason that an attack involves losses. An operation of this character is an attack with insufficient force,

if we assume that the enemy is in fact present with his main body. Troops taking part in a reconnaissance in force frequently have no information of the object of the movement nor of the extent of the forces involved, and in consequence conduct themselves as they would in an attack made by the entire army. This may be illustrated by a reconnaissance made in June, 1864, against forces under the Confederate General Johnston at the foot of Kenesaw Mountain. An Ohio regiment of infantry, one of the regiments of the force making the reconnaissance, attacked so aggressively against a strong position held by part of the enemy that they suffered a loss of ninety-eight killed and wounded, including seven officers, out of a total strength of three hundred and sixty-nine. This loss was heavier than that sustained by the regiment in any of the great battles in which it participated during the war.

A special reconnaissance is made for the purpose of determining specific information, for example, whether a bridge has been destroyed or a designated position fortified.

Patrols are small detachments sent out for the purpose of obtaining general or specific information, largely by observation, although a patrol at

times may be expected to engage in combat with opposing detachments for the sake of accomplishing its ends. Patrols usually consist of cavalry or infantry. They seldom consist of less than three men or more than a company. There are many other classes of patrols, the designations of which serve to illustrate their functions. These are officers patrols, reconnoitering patrols, visiting patrols, flanking patrols and connecting patrols. Officers patrols are perhaps the most important. It frequently happens that on the march or in deployment for attack questions arise concerning features of the terrain which might have influence on the movements of the forces or the conduct of the operations. If they are not held by the enemy in force and are within a reasonable distance, an officer, accompanied by a detachment of men, is sent to the point for the purpose of obtaining the information desired in making the necessary report. The men accompany him for the purpose of protection and in order that they may drive off hostile patrols and enable the officer to complete his mission. This may involve the making of a sketch or the examination of the ground, or observation of the enemy through his glasses. In similar manner an

officers patrol may be sent to determine facts relating to a river, its depth, width, swiftness of current, liability to sudden rises, etc. In like manner reconnoitering patrols may be sent out to obtain information concerning the occupancy by the enemy of particular points such as woods, ravines, farm buildings, fences, defiles, etc.

Visiting patrols move between the main body and a subdivision for the purpose of checking up its security. Flanking patrols, as the name indicates, are detachments thrown out to protect the flanks of a unit either on the march or when halted.

All patrolling work which involves considerable travel should be made by cavalry, because of its mobility. Patrols sent out for the purpose of quietly reconnoitering the enemy's position, seek to obtain their information by stealth and observation rather than by force. The better trained the men who constitute small patrols, the more valuable and greater in amount, will be the information they obtain. At night a patrol may succeed in advancing one of its number close enough to the enemy's pickets to overhear conversation. Again, a patrol may advance one of its number safely to some point from which he can see or hear sights and sounds which indicate much to him as a

trained soldier. For example, if late at night the camp fires of the enemy seem to appear and reappear, it is evident that the men are up and moving about. This would indicate the enemy's departure, either for offensive purposes or for retreat. If the fires are kept burning brightly throughout the night and there is little evidence of movement about them, it is probable that they are kept burning by a detachment for the purpose of deceit and to cover the retreat of their main body. The braying of mules is usually a sign indicating the arrival of other animals. The rattling of wagon wheels, cracking of whips, barking of dogs, announce the arrival or departure of organizations. The whistling of locomotives indicates train movements. There are many clues which determine whether troops are arriving or departing, although frequently such clues are purposely manufactured by the enemy to deceive the opponent.

Reconnaissance, therefore, is the name given a strictly military effort to gain information concerning the enemy; to be acquired by stealthy observation if possible, but by force when necessary.

So far as security is concerned, it may be said,

generally, that it may be considered under two heads; offensive security and defensive security. The former includes the advance guard, the flank guard and the cavalry screen, while the latter includes outposts, rear guards and also at times the cavalry screen and flank guards.

Every military force, no matter what its size, from the squad to a field army, protects its advance in hostile country by an advance guard. The advance guard itself, when it is designated as the detachment to perform the security function for the main body, protects its own local advance by sending out its own advance guard in the form of a subdivision detached for that purpose. In like manner this subdivision throws out its own little advance guard, and this process is continued until ultimately with decreasing distance between subdivisions, we reach what is called the point. This usually consists of a noncommissioned officer and three men. There are no set measurements for the distances separating the subdivisions of an advance guard, nor are there set rules governing the strength of the subdivisions. These depend upon the nature of the country to be traversed and the proximity and strength of the enemy. It may be said, however, in a general way, that the de-

tachment designated as the advance guard precedes the main body by such distance as will keep the latter out of rifle and artillery fire should the advance guard meet the enemy. The distance should be great enough, if the advance guard is driven back, to allow time for the main body to make substantial deployment so as to receive the enemy under conditions favorable to the army. The advance guard having assumed such position, which will usually be from one-half mile to a mile and a half or even two miles, detaches a portion of its strength and sends it on as its own advance guard. The main portion of the force is then designated the reserve of the advance guard, while the subdivision sent on in advance is known as the support of the advance guard. The support in like manner throws out, a few hundred yards in its own front, a subdivision which is known as the advance party, and it is this subdivision which throws out in its front the squad known as the point. The advance part reconnoiters to the front and flank to guard the support against surprise by sending patrols to particular points to see that the country is free from the enemy or to observe the enemy if he be present.

The duties of the advance guard are:

(1) To guard against surprise and furnish information by reconnoitering to the front and flanks;

(2) To push back small parties of the enemy and prevent their observing, firing upon or delaying the main body;

(3) To check the enemy's advance in force long enough to permit the main body to prepare for action;

(4) When the enemy is encountered on the defensive to seize a good position and locate his lines, waiting the arrival of supporting forces;

(5) To remove obstacles, repair the road and favor in every way the continuous march of the column.

The operations of the advance guard are outlined in the last two chapters of the book.

Where the army is making a flank march near the enemy, a flank guard becomes of great importance, owing to the vulnerability of an army when attacked in flank suddenly and unexpectedly. The flank guard is therefore a force thrown out toward the enemy, but whose march parallels that of the column it is protecting. It marches with its own advance guard and its relation to the main column should be such that if attacked, the latter

can, if necessary, go to its support promptly and efficiently. Occasions may, however, arise where the flank guard will be required to fight a delaying action without assistance in order to protect the continued movement of the main body.

The rear guard as its name indicates, is a detachment thrown out to cover the retreat of a column. It is constituted very much the same as the advance guard, except that instead of moving toward the enemy with its point in advance, it moves from the enemy with its point at the rear. Like the advance guard the strength of the rear guard depends upon the nature of the country and the strength and character of the pursuing force. Unlike the advance guard, however, it cannot count on the support of the main body. Cavalry and machine guns are especially effective with the rear guard. The best known example of rear guard action is that furnished by the rear guard of the French army in the retreat from Moscow. The rear guard was under command of Ney, and its heroic conduct in protecting the retreat of the French column, is historic.

The ability of the cavalry to fight on foot, in hastily constructed intrenchments, compelling the pursuing enemy to deploy and when the deploy-

ment is concluded to mount up and move back to a new position, makes the cavalry particularly valuable in rear guard action. Advance guards, flank guards and rear guards are in the nature, more or less, of local protection for troops on the march. Reconnaissance as explained, frequently extends beyond the local sphere of protection. But in large movements where secrecy is desirable, additional precautions are necessary. This is provided for by the cavalry screen. The function of the cavalry screen can best be illustrated perhaps by the action of the German cavalry in the Franco-Prussian War of 1870. As Count Hohenlohe puts it, the German cavalry in that campaign "overflowed the country for miles, even several marches, ahead of the main bodies of the infantry." In that campaign the German armies were preceded by bodies of horsemen who moved fifteen to twenty miles in advance, driving back even considerable forces of the enemy who sought to oppose them. The same principles which govern the security of forces generally, apply to the cavalry engaged in screening operations. The screen does not necessarily mean that the cavalry is equally distributed in detachments, with equal intervals along the entire front to be screened.

On the contrary, the cavalry screen itself covers its own advance with patrols more or less evenly distributed, these in turn supported by groups of contact troops. These are followed by larger groups in support, and these latter by still larger detachments which constitute the cavalry reserves. This formation enables the cavalry commander when a particular part of his line has met strong resistance to reenforce it without breaking up other parts of his line or lessening its screening value. The supporting detachments are so disposed as to most readily be available at the point needed.

The foregoing covers the security of troops in movement. When troops halt and go into camp, their security must also be provided for. The troops constituting the detachments charged with the security of camps and bivouacs are designated, the outposts. The size and disposition of an outpost will depend upon the size of the command, the proximity of the enemy, nature of the ground and similar circumstances. It may vary from a small fraction of the command to one third the entire force, but it should not be stronger than is consistent with reasonable security. This is so because of the desirability of preserving the strength

of the men in campaign by giving them every opportunity for rest. When a command is on the march and halts for the night, the advance guard usually continues on duty for the night as outpost, being relieved the following morning when the new advance guard crosses the line of the outpost. Troops on outpost duty keep concealed as much as is consistent with the performance of their duties. Infantry troops generally perform outpost duty, particularly at night. Artillery and machine guns, however, are desirable for sweeping defiles and large open spaces.

An outpost is generally divided into four parts. These, in order, as one proceeds from the main body are, the reserve, the line of supports, the line of outguards and the advance cavalry. There can be no uniformity of distance between these lines. The distance will always depend upon circumstances. The reserve constitutes the main body of the outpost and is held at some central point from which it can readily support the troops in front or hold a position on which they may retire. The supports constitute a line of supporting and resisting detachments, and furnish the line of outguards. The supports are numbered con-

secutively from right to left, and are placed at the more important points on the outpost line. Their line is usually a line of resistance, or the line which is to be held in the event of attack.

The outguards constitute the line of small detachments farthest to the front and therefore nearest to the enemy. They are classified as pickets, sentry squads and cossack posts. They also are numbered consecutively from right to left in each support. A picket is a group of two or more squads posted in the line of outguards to cover a given sector. The picket furnishes patrols and sentinels or cossack posts, for observation. A cossack post consists of four men. It is an observation group, but employs a single sentinel. With efficient cavalry in front to reconnoiter in advance of the line of observation, the work of the infantry line of observation is reduced to a minimum. At night, however, the cavalry is usually withdrawn in order that the horses may have needed rest and because outpost work at night can be better done by infantry.

Patrols and sentinels must be the first troops which the enemy meets and each body in rear must have time to prepare for the blow. Each line of

groups endeavors to cause as much delay as possible in order to afford more time for the supporting detachments to prepare.

One of the unpardonable offenses of a military force is to be surprised. This illustrates the importance of the subject of security and information. Military history is replete with examples of the most momentous consequences which have flowed from the failure of detachments to properly perform their functions as advance guards and flank guards, but more particularly as outposts.

CHAPTER XVI

COMBINED ARMS IN ACTION

The use of the combined arms in battle, the relations which each arm bears to the others, and the relative limitations and possibilities of each may best be illustrated by following the movements of a division in a hypothetical action. The division is the unit in the organization of an army, which is complete in itself, both for tactical and administrative purposes, and includes all the auxiliary arms of the service. It numbers about 20,000 men in most armies, and these numbers are so fixed because they constitute the greatest number of men who, marching on a single road may be brought into action on the same day, after the head of the column becomes engaged.

The American division may be taken as typical of the organization of that unit of an army. In the United States service, the division consists of three brigades of infantry of three regiments each, each brigade commanded by a brigadier general. Each regiment is commanded by a colonel and

consists of three battalions commanded by majors, each battalion having four companies commanded by captains. At war strength the companies have 150 men, and the regiment with the machine gun, supply and sanitary detachments has approximately 1800 men. The infantry of the division therefore numbers about 16,000 men. Each regiment is provided with 22 wagons and a total of 171 draft pack and saddle animals. It is apparent that when such a force is on the march in column of fours it occupies considerable road space. Exclusive of the wagon trains, this road space for the three brigades amounts to about 10,000 yards or about five miles. This includes allowance for what is called elongation, which is an extension of the column due to minor delays, differences of gait, varying grades and conditions of the road. To provide for the security of such a column on the march, part of it is necessarily employed as an advance guard or as a flank or as a rear guard. The ratio which the force so employed bears to the entire force, depends upon the proximity, strength and direction of the enemy. It is the duty, for example, of the troops employed as an advance guard to precede the main body by at least a mile, preserving contact and communica-

tion with it by connecting files, and to scout the country across the zone of the march of the main body. The advance guard provides for its own protection against surprise by throwing out subdivisions to precede it and to guard its flanks, at the same time detaching small parties, called patrols, to visit and scout all woods, ravines, villages and other places within the zone of the march that might afford shelter for forces of the enemy. It is the function of the advance guard to drive back all parties of the enemy, and to do this aggressively so that the march of the main body may not be delayed or interrupted. If the enemy is encountered in force, the advance guard deploys and fights. Because of its strength and the distance separating it from the head of the main body, there is time and ground sufficient for the main body to make substantial deployment before becoming engaged. This plan of providing for the security of troops on the march enables the major portion of the force to march without the great fatigues incident to scouting and the nervous strain of unremitting vigilance. These hardships are imposed on the subdivisions charged with the security of the entire command. Organizations take their turns in performing this duty.

Owing to the amount of ground to be covered in visiting and examining suspicious places within the zone of the march and of the necessity to gain high points to view the country in advance of the march of the column, infantry is not as well adapted for much of this work as are mounted men. In order therefore to conserve the strength of the infantry, the division is provided with a regiment of cavalry commanded by a colonel, and consisting of three squadrons of four troops each. The squadrons are commanded by majors, the troops by captains. The regiment consists of approximately 1200 men and 1435 draft, pack and saddle animals. It is the function of the divisional cavalry regiment to guard the division on the march against surprise, by preceding it and cleaning out all small detachments of the enemy lurking in its front or on its flanks, and, by finding the enemy and keeping him in observation, always to keep the division commander appraised of the enemy's movements. When the cavalry is assigned to precede the advance guard, to lighten its labors and cooperate with it, it is acting as advance cavalry. When charged with an independent mission, it is called for the time, independent cavalry. The cavalry of the division performs

many functions in addition to advance guard work. It is used to protect or convoy wagon trains on the march, to attack and seize the enemy's trains or to locate and capture supplies and forage in the enemy's country for the use of the division, to advance rapidly and to seize and hold important stream crossings until the more deliberate arrival of the division. On a retreat, the cavalry by reason of its mobility is used in the fighting of delaying or rear guard actions, to cover the retirement of the division. To fully perform its functions, always the commander should keep his chief advised of his movements and of all information gathered by him concerning the enemy. In the excitement of combat and of rapidly transpiring events, this duty is often neglected, and when this happens, the division is robbed of its sight, for the cavalry squadrons are the eyes of the division. An example of this is indicated by the operations of the Confederate cavalry under the great Stuart during Lee's invasion of Pennsylvania in 1863. The function of the Confederate cavalry was to parallel the march of the army of invasion, screening its movements from the enemy.

Instead of keeping his forces between Lee's army and the Union Army, Stuart conducted a

raid to the east of the Union Army, and after several engagements with their cavalry, proceeded north. By that time the Union Army was also marching north, paralleling the route of Lee's Army. Thus the Union Army was between Lee and his cavalry, and Lee was getting from his cavalry no information of the enemy. When Lee reached Chambersburg, Pa., on June 28, he learned for the first time that the Union Army had crossed the Potomac and was marching north. Stuart did not rejoin the army until the close of the first day of the Battle of Gettysburg, having marched completely around the Union Army.

As the defensive power of infantry may be greatly augmented by recourse to hastily constructed entrenchments, it is possible for a relatively weak force of infantry to greatly delay the march of superior numbers of infantry. It is also possible for forces of infantry untilizing hastily constructed entrenchments, to successfully stand off the fire attacks of greatly superior numbers. For the purpose, therefore, of providing the infantry division with means for overcoming the resistance offered to the march of the division by entrenched bodies of the enemy's infantry and to enable the infantry of the division to attack en-

trenched positions, a brigade of field artillery is provided as a tactical part of the division. The field artillery is commanded by a brigadier-general and is composed of two regiments of light artillery, each composed of two battalions of three batteries each. Regiments are commanded by colonels, battalions by majors and batteries by captains. The twelve batteries aggregate 48 guns and 144 caissons. Each battery carries with it in its caissons, 358 rounds of ammunition per gun or over 17,000 rounds for the brigade. The brigade has about 2300 officers and men, and a total of about 2300 draft, pack and riding animals.

While the batteries are normally light batteries, the composition of the brigade may include a heavy field artillery battalion in place of one of the battalions of light artillery. In the march of the division, it is usual to place one battalion of the field artillery as part of the advance guard, to enable the latter more quickly to overcome opposition. The road space occupied by a brigade of field artillery, exclusive of the field trains, is about 5000 yards, or nearly three miles.

It frequently happens that the enemy in seeking to oppose the march of the division, will fell trees and destroy culverts and bridges along the route.

For the advance guard, without special tools and appliances to remove such obstacles and to construct temporary bridges to replace those destroyed, would involve a great expenditure of time. It is apparent in any event, that such work would be more expeditiously and better done by men of special training and skill. The division is, therefore, provided with a pioneer battalion of engineer troops commanded by a major. The battalion consists of 3 pioneer companies, each commanded by a captain. The battalion has approximately 500 officers and men, and 162 draft, pack and saddle animals. It is provided with tool wagons containing the tools and implements necessary for the construction of improvised bridges, the repair of roads, demolition of obstacles, and other similar functions. A detachment of engineer troops usually marches with the advance guard so as to be promptly available with tools and men to meet emergencies. When the division acts independently an additional battalion of engineer troops is usually attached to the division. This battalion is a ponton battalion having pontons and materials for hastily constructing bridges over rivers.

The road spaces occupied by the combatant troops of a full division on the march aggregate 9

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A supply tram composed of requisitioned motor-busses moving along a road to the base of the army

miles, and including the field trains without distance, this road space amounts to 15 miles. It will readily be seen that communication from any part of this column to the more remote units, presents a serious problem. Assuming that a mounted messenger could travel on the same road with the division at the rate of five miles per hour, it would require 6 hours for him to take a message from the head of the column to the rear and return with an answer, if the division were not in motion during that period. If the division were moving, the time consumed in going from the head to the rear of the column would be reduced by the time equivalent of the distance covered by the column while the messenger was proceeding to the rear. On the other hand, throughout the return trip, the time gained would be neutralized by the fact that the column would be moving in the same direction with the messenger. The desirability of a more rapid agency of communication becomes apparent. The average rate of march of a body of troops as large as a division is from 2 to 2½ miles per hour. There are many occasions in campaign when regiments or other units of the division are detached to fulfil special missions and it is usually of importance that communication be

maintained between the division commander and the troops so detached. It is equally desirable that the cavalry, operating perhaps 10 miles or more in advance of the division, should have a means of rapid communication with the division commander.

Military art avails itself of all the sciences by adapting their inventions and discoveries to the needs of the military service. And so the division has at its command for the purposes of rapid communication, all the agencies used in the commercial world, as well as those peculiarly the product of military necessity. As the use of some of these agencies requires technical knowledge and training, the organization of the division includes a battalion of signal troops. This battalion is commanded by a major and is made up of a wire company and a radio company, each commanded by a captain. The battalion aggregates approximately 170 men, and 180 draft, pack and saddle animals. The equipment of the battalion includes a shop wagon and 20 miles of wire, 6 wire carts, 2 instrument wagons and 4 radio sections. It is, therefore, possible for the organizations of a division to communicate with each other, not only by mounted messenger, but by

field telephone, field telegraph, flag signals, heliograph, semaphore, acetylene gas lamp (for night use) and wireless. The personnel of the signal companies are so highly trained and so many clever devices have been provided for expediting military communication, that it is now possible for the division commander to communicate directly by telephone with any important sub-division of his command without interrupting the march.

The problem of handling the wounded during and after a combat, presents greater difficulties as civilization increases its demands in respect to the care of the wounded. In the battles of ancient times, the wounded were left to shift for themselves. If not too seriously injured, they rejoined their commands. If too badly injured to do this, they were of no further use to the army and the army moved off without them. In the organization of the modern army, provision is made for the humane care of a reasonable precentage of wounded, and an extensive system has been established for rendering first aid to the wounded and for removing them with diligence from the field of battle.

The American division is provided with a sani-

tary train, composed of 4 ambulance companies, 3 field hospitals and a medical reserve. These aggregate over 500 officers and enlisted men, and approximately 500 draft, pack and saddle animals, and include an equipment of 48 ambulances and 42 wagons. The sanitary train is commanded by a colonel or lieutenant-colonel of the medical corps. The ambulance companies are commanded by captains and the field hospitals by majors, all of the medical corps. The field hospitals provide 216 beds for the temporary care of the wounded. A section of one of the ambulance companies usually accompanies the advance guard so as to promptly provide transportation to the rear for the wounded. In order to understand the methods employed by the sanitary troops, it is necessary to appreciate the importance of promptly evacuating the field of wounded men. Not only is this desirable from the view-point of the wounded, but it is necessary in order to keep at the highest standard the morale of the survivors and to enable them to perform their fighting functions unencumbered by the depressing demands of their less fortunate comrades.

In addition to the sanitary train, each regiment has its own hospital corps detachment. The rela-

tion which these detachments bear to the sanitary organizations of the division and the methods employed by them in handling the wounded, will be explained in describing the conduct of a division in a hypothetical action. In addition to the ambulance companies and field hospitals, there is also provided a medical reserve of one medical officer and a small detachment of enlisted men, with six wagons for carrying reserve medical stores.

As the American infantry division complete aggregates more than 22,000 men, 7600 animals and about 900 vehicles, including field artillery carriages, it is apparent that the supply of this force with subsistence, forage, ammunition and stores, is one of some magnitude. In addition to the wagons which accompany each regiment and which are known as the regimental field trains, there is provided for the division, an ammunition train, a supply train, an engineer train, and a pack train. The ammunition train consists of 162 four-mule wagons, over 700 mules and horses and a detachment of about 200 men as a necessary personnel. The supply train consists of 126 four-mule wagons, over 600 mules and horses and a personnel of nearly 200 men. The pack train

consists of 50 pack mules, having a cargo capacity of 6 tons. The engineer train consists of 9 mule-drawn wagons, the necessary number of animals, and the men to drive and care for them.

For the purpose of illustrating how this force, known as the division, tactically operates, eats, sleeps, marches, fights, avoids surprise, replenishes ammunition, rations and forage, removes the wounded, buries the dead, replaces losses, maintains discipline, rewards the worthy, punishes the delinquent, and generally conducts its daily affairs in campaign, let us now assume a state of facts and a mission for a division in campaign.

Let us assume that war has been declared between Red and Blue Governments; that the division which we are to follow is the Red division encamped in and about the town of Campville, through which runs a railroad from the important town of Basic City in Red territory through Campville and across the border north into Blue territory; that Campville is within 10 miles of the Blue border. For strategic reasons deemed proper by the Red government, orders are sent to the Commanding General of the Red division to march with his division on the following day

into Blue territory and to seize and hold the important railroad junction at Junction City in Blue territory, a distance from Campville of 30 miles. It is assumed that the Red division is complete in every way and that its officers and men are trained professionally and physically for the demands of war. No information of the enemy likely to be encountered by the Red division is known except that Blue detachments of all arms are in the vicinity of Junction City.

When the Red commander receives his orders, he makes what is called an estimate of the situation. This estimate of the situation for the purpose of convenience follows a set structural form. According to this form, he first considers and determines his mission. This he determines to be the capture of Junction City with its railroad yards, bridges, supply depots, military property and approaches. To increase his chances for success, celerity of movement is desirable, and he therefore determines to move promptly for the seizure of that place.

His next thoughts turn to considerations affecting the enemy. He considers all information concerning the strength of forces that may oppose him; the character and composition of such

forces, and their location and disposition; the roads and railroads available to them for their concentration and movements; the terrain available to the enemy for defensive purposes or for offensive action against his own forces; their supply and communications; and finally he considers the possible lines of action open to his opponent and the latter's most probable line of action. We will assume that his study of these matters, based on all the information at hand, leads the Red commander to believe that the enemy upon learning of his approach, will entrench and hold a line of hills which are shown on his map about 3 miles from Junction City towards the Red boundary, the position being protected on one flank by an unfordable stream and on the other by an extensive swamp.

The Red commander now turns his thoughts to considerations affecting his own forces, and in like manner he considers his own strength, the character and composition, location and disposition of his forces; the terrain which he will have to traverse, the roads and railroads available for the movement of his troops; his supply and line of communications; and finally he will consider the possible lines of action open to him, and from

among them will adopt what he believes to be the best possible line of action.

We will assume that after considering these factors, he believes that his division can best march on two roads which parallel one another from the vicinity of Campville to and through Junction City and are separated one from the other by a mean interval of one mile; that his supplies which have been coming to him by rail from Basic City will be available at Campville for refilling the wagons of his supply train as they require replenishment, at least until the division advances well towards its objective; thereafter, if the railroad is in condition, he may advance the refilling point to some station on the railroad closer to the front and requiring less travel for his wagons. He observes from the map that there are no serious obstacles to his march presented by the terrain, except an unfordable river cutting across the line of his advance and distant from Campville 18 miles. The river in the vicinity of the line of his march is crossed by three bridges, one for the railroad and the others carrying the highways referred to.

Having determined his mission and considered all things affecting the enemy and his own force,

the Red commander now arrives at a decision. His decision is to march from Campville the following morning at 6 o'clock towards Junction City. It will be noted that he does not decide how far he will march and this is in accordance with a military principle, that the commander should not commit himself in advance to future lines of action which by reason of intervening circumstances he may not be able to follow. The length of his march will depend on the condition of the roads, the state of the weather, the opposition or lack of opposition of the enemy, and many other factors.

Having arrived at this decision, it is now necessary for him to issue an order to make effective that decision and to prescribe the manner in which it is to be executed. This class of order is called a field order, and the particular order to be issued under these circumstances is known as a march order. A form of field order has been adopted in most armies. It was found that by following a common form of field order, ground for misunderstanding was reduced, verbosity was decreased, a more general and common understanding of what was desired was insured and altogether better team work made more certain.

The prescribed form of order has five paragraphs. In the first is briefly set forth information concerning the enemy and of our own supporting forces. In the second paragraph is set forth the plan of the commander. In the third paragraph is stated the manner in which the plan is to be carried out. This paragraph includes subdivisions containing the instructions for independent cavalry—the place and time of departure and any special mission imposed on the cavalry; in the next subdivision is contained the instructions for the advance guard—the place and time of their departure, the distance which it will precede the main body and the route to be followed; in the next subdivision is set forth the instructions for the main body including their time of departure; in the next subdivision is set forth instructions for a flank guard (if any); in the next subdivision is set forth instructions for the signal troops—communications to be established by them, etc., and in the last subdivision is usually set forth the instructions for the outposts—when they will stand relieved and their subsequent duties. The fourth paragraph of the order governs the movements of the field trains and of the sanitary, ammunition, supply and engineer trains.

As it is also desirable for subordinates to know where they may expect to find their commanding general, the fifth and last paragraph of the order contains a statement where the commanding general may be found or where messages for him may be delivered.

In march orders it is customary to write on the left hand margin of the order under appropriate subheads the order in which the troops will march in the column. When complete, the order is communicated to the officers concerned, either by furnishing them with correct copies or by communicating to them by telephone or telegraph the contents thereof. The order issued by the Red general in this case would read as follows:

Field Orders No. 1	1st Division, Red Field Army, Campville, Red Territory, 20th Jun. 14, 8 P. M.
Troops	
(a) *Independent Cavalry* Colonel C. 1st Red Cavalry, Det. Signal Bn.	1. Detachments of the enemy, including cavalry and artillery are reported to be in the vicinity of Junction City. The remaining divisions of our field army are at Xville.
(b) *Advance Guard* Brig. Gen. 1. 1st Infantry,	2. This division will march tomorrow morning towards Junction City.

2nd Infantry,
2nd Bn. 1st Field Arty.
Co. A, Bn. Eng.
Det. Co. A, Sig. Bn.
1 Amb. Co.

(c) *Main body.*
in order of march.
3rd Infantry,
2nd Field Arty.
3rd Brigade.
Bn. Eng. (less Cos. A & B)
Bn. Signal Corps (less detachments)
3rd and 4th Amb. Cos.

(d) *Right Flank Guard.*
Brig. Gen. 2.
2nd Brigade,
1st Field Arty. (Less 2nd Bn.)
Co. B, Bn. Eng.
Det. Signal Bn.

3. (a) The Independent Cavalry will leave its camp tomorrow morning at 5.30 A. M., scout the country between Campville and the river 18 miles to the north thereof, securing the railroad and two highway bridges over the same.

(b) The advance guard will clear the north entrance to the infantry camp at 6 A. M. and march on the Campville-1-3-5-Junction City road.

(c) The main body will follow the advance guard at one mile.

(d) The right flank guard will leave the easterly entrance of the infantry camp at 6 A. M. and march on Campville-2-4-6-Junction City road.

(e) The signal battalion will provide and maintain communication between the independent cavalry, advance guard and flank guard and the main body.

(x) The outposts will stand relieved when the advance guard clears the line of out-

2nd Amb. Co.

post supports, and thereupon rejoin their organizations.

4. Field trains will follow the main body without distance. The Field Hospitals, ammunition, supply and engineer trains will follow the field trains at 3 miles.
5. Messages to head of main body.

By command Major General, Red,
COLONEL XYZ,
Chief of Staff.

Copies to Brigade Commanders,
Cavalry Commander,
Engineer, Signal & Sanitary Commanders,
Commanders of Trains,
Members of Division Staff,
A synopsis in cypher by wire to Field Army Headquarters.

When this order is received by the commanding officers of the organizations concerned, they notify their subordinates of the hour of the march the following morning, and prescribe the details as to the hours of rising, messing and breaking camp necessary to enable the command to march on time. From one to one and a half hours is usually the time allotted. Six o'clock therefore on the following morning will see the heads of the

two columns leaving camp, the left being the point of the advance guard of the main body and the right the point of the advance guard of the flank column. While the right hand column is a right flank guard for the main body of the division, it must nevertheless provide for its own security by throwing out its own advance guard. The details of the order of march and security of the right flank column are left with the commanding officer of that column, who is Brigadier General 2. And so Brigadier General 2 issues his own order governing the details of this column. In the same manner while the above order prescribes what forces will constitute the advance guard, the details of disposing those forces rests with the advance guard commander, and he in turn issues his own order governing the march of the advance guard. It will be found that a fundamental principle of military control is that an order, while prescribing the objective and fixing the limitations, should stimulate initiative and encourage resourcefulness by leaving to the subordinate the ways of attaining the objective.

Half an hour prior to the start of the two infantry columns, the cavalry left its camp at a walk, also throwing out an advance guard. Upon

reaching the outskirts of Campville the regimental commander called the three majors together and pointed out to them what he considered to be the zone of march of the division. He stated that for purpose of security he considered this zone to be about four to five miles wide. He thereupon divided it approximately into two parts, assigning the right half to Major A and the left to Major B. He told them to cover their own sectors with their scouts and patrols, and to advance without delay toward the river, scouting the intervening country—that he with the remaining squadron would follow as a reserve on the 2-4-6 road, keeping in touch with Major A's squadron in front of him. He added that he did not believe they would meet the enemy in any force at least for some miles, and suggested that in open stretches of country, the trot be taken up so as to expedite the movement. We will now leave the cavalry to carry out this plan and return to the infantry column.

Reference to the order will show that the infantry assigned to the advance guard constituted two regiments. Brig. Gen. I, who commands the advance guard, determined that he would hold one regiment as his reserve and advance the other

regiment as a vanguard or support, and he directed this to be done. He determined that with his reserve regiment, he would place his field artillery and his sanitary and signal detachments. He sent the engineer company with the advance regiment. The Colonel of the advance regiment in turn divided his force by holding two and a half battalions as a support and sending two companies in advance as an advance party. The Major commanding the advance party preceded the support by about 500 yards with his two companies and sent out a point about 200 yards in advance of his subdivision. The advance guard thrown out by the right flank column was disposed in similar manner. Thus we see two columns paralleling each other, each resembling a human arm and hand, the arm representing the main body and the hand the advance guard. The hand represents the reserve of the advance guard, the hand knuckles the supports, the finger knuckles the advance parties and the finger tips the points, scouts and patrols. The functions of these subdivisions resemble very much the functions of the parts of the hand referred to. This may be illustrated by conceiving a man advancing in the dark with his hand outstretched before him to provide for his

own protection. If he meets an obstacle the first information conveyed to his mind will be flashed by his finger tips. To investigate further he may press with his fingers or knock with his knuckles. If he determines that the obstacle can be thrust aside, he strikes with his fists and if that blow is insufficient he follows it with the full weight of his arm. If the obstacle resists the efforts of his arm, he may often overcome it by kicking and shattering it. The division operates in the same manner. If the advanced subdivisions cannot unaided promptly overcome opposition, they are reenforced by the supporting subdivisions and if necessary the artillery is brought up to pound the opposition to pieces.

Over a mile behind the advance guard we see marching along in column of squads, the troops of the main body. At or near the head of these troops the Division Commander is riding. He is accompanied by the members of his staff who are not temporarily away in furtherance of their duties. The most important of these assistants is the Chief of Staff who ranks as a lieutenant-colonel and who is a specially trained officer, usually a graduate of the War College and a member of the General Staff. He is a confidant of the

Division Commander and knows the latter's plans. He is the General's executive officer. He is assisted by two officers of lesser rank who are known as Assistant Chiefs of Staff. As the division is an administrative unit, daily records must be kept of its numbers, supplies, movements, losses and activities generally. These records are kept by an officer on the General's Staff known as the Division Adjutant. He usually ranks as a major. The Chief Quartermaster and Chief Surgeon are other assistants.

The troops are marching in route order, which means that they may converse, and carry their arms and adopt strides according to individual preference. Coming to a rise in the ground we may see by looking back, assuming that the day is clear and the road dry, a long column of thick dust marking the route of the march. As we stand to watch the men of the column move past, we frequently hear an officer or non-commissioned officer admonish those about him "keep closed up there," "don't straggle; close up." These commands so frequently given, excite our curiosity, particularly when we fail to observe any conduct of the men amounting to actual straggling. These commands, however, are but an expression of the

realization by the trained officers and non-commissioned officers, of the importance of avoiding elongation of the column. An increase of distance between successive sets of fours, be it ever so small, becomes material when multiplied by the number of these subdivisions in the column. Elongation means delay in placing rifles on the firing line when contact with the enemy is made. The quicker the men are fed into the firing line the greater is the opportunity for a preponderance of numbers and of superiority of fire, and we have seen in an earlier chapter that the side which has the greatest number of men at the proper time and at the proper place normally succeeds. For fifty minutes we watch the troops march by, the men carrying in addition to the rifle, a bayonet and ammunition, a pack containing a blanket, shelter half, haversack with rations and mess kit, entrenching tool and a canteen of water.

At the end of fifty minutes, the column halts. Let us inquire into the reason for the halt. We learn that it is customary on normal marches for the Division to march without interruption for fifty minutes and to rest for ten minutes, and that the normal day's march of the Division is eight to twelve miles. In the fifty minutes of march-

ing, if there has been no interruption, the column will have advanced between two and two and a half miles. When the troops halted it was observed that both the infantry and the field artillery closed in to the right side of the road, leaving the left side unobstructed. This was for the purpose of permitting aides, orderlies, messengers, and the signal detachments to have an unobstructed way for their movements up and down the length of the column.

While waiting for the column to resume the march, let us see how well prepared are the soldiers for possible action. An examination of their pack and equipment will show that each soldier carries on his person 100 rounds of ammunition, but that there is available for prompt distribution on going into action, an additional 120 rounds per man which are carried in bandoliers, packed in boxes and transported in the regimental combat wagons. These wagons march with the troops, two to each battalion. We find that some of the men are provided with small light shovels while others are provided with light mattocks for the purpose of hastily constructing entrenchments. Each man carries affixed to his belt a small hermetically sealed packet containing

first aid compress and bandage. In the haversack will be found rations for three days, two being what are known as haversack rations, and the third an emergency ration which is not eaten while there are available any other rations and then only with the authority of the commanding officer.

The column now resumes its march and we observe the field artillery go by. We note that although the artillery horses are at a walk in order to conform their gait to that of the infantry, the drivers, riding the near horse of each pair and controlling the other with a short rein, are sitting erect and alert. We note that the officers and non-commissioned officers constantly supervise the drivers and we learn that the object of this supervision is to insure that the drivers do not slouch in the saddles and that the traces of all the horses are kept taut, so that an unequal share of the draft will not fall on any one pair. We are also informed that at each ten-minute halt the drivers of the field artillery dismount, raise and examine the feet of the horses for loose shoes or wedged stones; that the harness is looked over; that the necks and withers of the horses are examined, and the bearing surface of the collars washed free of

sweat with a wet sponge provided for that purpose. Similar care is exercised to preserve the efficiency of all the other mules and horses in the column.

Let us now rejoin the Commanding General and his staff. We learn from him that messages have been received from the commander of the flank guard and from the commander of the advance guard; that they have seen nothing of the enemy and that no obstacles were encountered in the road, except that at 9 A. M. the advance guard of the flank column found a bridge destroyed where the road crossed a large brook. It was reported that the engineer detachment with that column was engaged in rebuilding the bridge, while the column itself by wading the brook above the bridge continued its march without delay. These messages were delivered to the Chief of Staff by mounted orderlies.

It is now 10:30 A. M. and the head of the column has reached a point eleven miles from Campville. At this moment the Chief of Staff rides up and informed the Division Commander that the cavalry hold the bridges they were directed to seize, having met with no opposition. Our interest is immediately aroused. How is it possible for the

Chief of Staff seven miles from the bridges to know that they have just been seized by the cavalry? In answer to our question, the commander of the signal battalion who is acting as the Chief Signal Officer of the Division, tells us that when the cavalry left Campville at 5:30 in the morning they were accompanied by a radio detachment of the signal troops carrying on pack mules a radio equipment. The equipment has a radius of action of fifty miles and is capable of being set up in a few minutes. The mules of this detachment trotted along with the cavalry reserve under the Colonel C's direct command. The signal officer further informs us that it was agreed before the departure of the cavalry that once an hour, on the hour, the radio section with the cavalry and one of the radio sections with the main column, would halt, set us and establish communication for the purpose of transmitting messages. In this manner it was learned shortly after 10 A. M. that the cavalry had marched rapidly to the river, at the same time scouting the intervening country, and had found the bridges unguarded; that they had pushed across the river leaving strong detachments in possession of the bridges, and are now engaged in scouting the farther side of the stream.

The Chief of Staff now asked the Division Commander if he had decided how far he would march. The General replied that the early seizure of Junction City was important; that his troops had been hardened by training, that men and animals were still fresh, and that he would halt at 12 o'clock, allow an hour for the men to eat and for the animals to be watered, and resume the march at 1 o'clock. This decision a few moments later was communicated by orderlies to the commanders within a mile, and to those more distant by means of the field telephone. The telephone wire of the signal company had been reeled out from a reel cart at the head of the column as the march progressed, and taken up by another reel cart at the rear of the column. The cart at the head of the column when its load of wire was paid out, and the cart in the rear when it had reeled up its capacity, being each replaced by a reserve reel cart provided for that purpose. On each cart sat a telephone operator with instruments attached to his head who transmitted and received messages through the reel of wire while it was being reeled out at one end of the column and taken up at the other. At stated distances along the fifteen miles of this stretch of wire marched mounted linemen

of the signal corps watching the line and provided with kits to make prompt repairs in case of a break.

At 12 o'clock the column halts and it is found that the men in anticipation of the halt have been picking up sticks of wood with which to make small fires. They clear the roadway, stack arms, unsling their packs and almost immediately numberless small fires are started. One of the two haversack rations is opened by each man and it is observed that it contains enough bacon, coffee, sugar and hard tack for three meals. The soldiers fill their tin cups with water from the canteens and place them over the fires to boil. Strips of bacon are fried on the mess pans, and soon the refreshing aroma of hot coffee and fried bacon tells us that the meal is ready to be disposed of. After this is done the embers of the fires are extinguished, mess kits are washed and canteens refilled in those units which find good water available. Where water is not available the mess kits are cleaned with bunches of grass or clean sand and replaced in the haversacks. Military animals are fed but twice a day, but during this halt they are watered and in the artillery the collars are opened up and the bearing surface washed. During the

halt the advance guard provides for the security of the column.

At 1 o'clock the officers' whistles blow attention, packs are re-adjusted and the column again moves off. During the course of the noon meal the General and the Chief of Staff discussed a possible camping place for the Division that night, and the General determined to occupy a farm about two miles farther on and about three miles from the bridges. This would require about one hour of marching after the noon meal for the head of the advance guard to reach the site selected for the camp. The General therefore directed the Chief of Staff to issue what is known as a halt order and that the Division would bivouac for the night at Brown's Farm. Thereupon the Chief of Staff wrote out an order of which the following is a synopsis:

Field Orders
No. 2.

1st Division, Red Field Army,
13 Miles north of Campville, Blue Territory,
20 Jun. '14, 1:15 p. m.

1. No further information of the enemy has been received. Our cavalry hold the bridges over the river four miles in our front.

2. The Division will halt for the night.

3. (a) The advance guard will halt and camp one mile north of Brown's Farm, and provide for the security of the camp.

(b) The right flank guard will camp (here is specified a part of the Brown's Farm large enough for the forces composing the right column.

(c) The main body will camp as follows (here is specified a part of the Brown's Farm large enough for the forces composing the main body).

4. Field trains will rejoin their organizations. The division trains will camp at Wayville.

5. Division Headquarters will be at Brown's Farm house.

By command of Major General Red

COLONEL XYZ, Chief of Staff.

Copies to, etc.

The Chief of Staff also sent a message by wireless to the Cavalry Commander, the body of which is as follows:

Division camps at Brown's Farm for the night; advance guard will camp one mile north thereof and form outposts. Scout well to the north of the river. If attacked, hold position on the north side of stream. You will be supported. Your wagons will join you. Division Headquarters, Brown's Farm House.

X. Y. Z., Chief of Staff.

It is natural that we should be interested in knowing how the Chief of Staff determined that Brown's farm possessed facilities for the camping of so large a number of men and animals. Inquiry develops that he made the assignments of space by inspection of his map and having in mind

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A firing-line behind wire entanglements as a protection against cavalry or infantry charges

the requirements of the several organizations. These requirements are tabulated in most armies and printed in the field service regulations. Officers usually commit them to memory. The Chief of Staff could tell from his map what land was clear and what land was wooded or swampy. The contour lines of the map indicated what land was level and what was not. The map also indicated the streams and their direction. He allotted space, so as to require of the Infantry as little extra marching as possible, and he sought to place the mounted organizations down stream, so as to leave the up stream water for the men, undefiled by the animals.

When the head of the main body arrived at Brown's Farm, the organizations moved to the allotted camping spaces, stacked arms and pitched their shelter tents. When the head of the column began this movement, the advance guard by that time had reached its assigned position and the commander was engaged in constituting of his forces the outposts to provide for the security of the main body of the Division during the night. The advance guard commander therefore became the outpost commander upon receipt of the halt order. He immediately consulted his map and

selected tentatively the best line from which to resist any attack the enemy might make on the camp. He quickly wrote out an outpost order in the customary five paragraphs, in which he prescribed the subdivisions of the outposts and their duties. In this instance he divided the sector to be covered by the outposts into four supports, numbering them from right to left and divided the sector among them. He indicated the line of resistance in the event of attack, and fixed the place where the reserve would bivouac. Each support commander threw out towards the enemy an outguard composed of detachments called pickets, each of which in turn sent further to the front individual sentries. An approaching enemy would therefore first meet a line of sentries, not the garrison type of sentry formally walking post, but men occupying points of vantage, screened from observation and with intervals between them not too great to enable them with reasonable diligence to cover the intervening ground. Behind the line of sentries at a distance of perhaps 400 yards would be found the line of pickets, the men resting quietly under cover guarded by one or two of their number. These forces constitute in general what is known as the line of observation. Behind the

line of pickets and perhaps 800 yards to the rear, will be found the line of supports, being the larger groups from which the pickets and sentries are detached and advanced to the front. The line of supports usually occupies the line selected for resistance in case of an attack. Perhaps 1,000 yards in the rear of this line and centrally located will be found the reserve. The men of the outpost reserve usually camp, eat and sleep as if they were part of the main body. However, because of their location they are more readily available to strengthen the line of resistance in the event of attack. The men further to the front are required to exercise greater vigilance and caution as their location gets nearer to the front.

Returning now to the main body we find that they began to make camp shortly after 2 o'clock in the afternoon, but we soon observe as regiment after regiment arrives that considerable time will elapse before the last organization in the column reaches its place of encampment. It now becomes clear why the Commanding General marched his division in two columns when he found there were two roads available, for what we see transpiring in the main body is being repeated simultaneously in the right flank column. If the Commanding

General had marched the Division on a single road, it would be approximately 6 o'clock in the evening before the last organization of the combatant troops reached its camp, and much later before the trains which follow, could rejoin their regiments. The advantages therefore of marching the Division on two roads not only cover the possibility of more promptly effecting deployment to attack the enemy, but enable the Division to make camp in about half the time it would otherwise have taken. It is also clear why the Commanding General halted for lunch between 12 and 1 o'clock, although he knew that the head of the column would reach Brown's Farm as early as 2 o'clock. He was thinking not only of the troops at the head of the column but of the troops at the rear of both columns, and these troops will not reach their places of encampment until approximately 4 P. M. Immediately following them are the wagons of the regimental field trains. They will arrive in time to enable the company cooks to prepare the evening meal with the kitchen utensils carried in the wagons, thus avoiding the necessity for individual cooking. The remainder of the day's ration carried by the men will constitute the evening meal, and this ration will be replaced from the

supply sections of the field trains. This will enable the men to follow the requirement that the soldier should always have on the person three days rations less the meal or meals consumed during the day.

As each organization enters the field assigned to it, we observed a small detachment with shovels from each company, digging a trench about fifty yards in the rear of its camp. This, it was explained, is the soldiers' water-closet, but as it possesses no water and no closet, it is not known by that name, but by the term sink or latrine. Rigidly enforced rules govern the use of these sinks, as a sanitary precaution against the contamination of water and the spread of disease through the medium of flies and mosquitoes.

Before the camp settled down for the night, wire communication had been established between the out-post supports and the out-post commander with the reserve, and from the out-post commander to the Chief of Staff at Brown's Farm. Radio communication was established between the cavalry across the river and the Chief of Staff, and similar communication between the division trains at Wayville and the Chief of Staff.

But while the soldiers of the division have little

to do after the completion of the camp chores, this is not true of the Division Commander and his staff. He will be found at Brown's Farm house studying his maps and preparing to issue a march order for the following day. Reports of all kinds are being received and acted upon. Let us examine some of these reports in order to learn something of the daily routine happenings in this migratory city of over 20,000 men and more than 7,000 animals. Here is a report that a soldier of the cavalry together with his horse fell from one of the bridges held by the cavalry; that both were drowned, but that the soldier's body was recovered. The Colonel asked to be informed what disposition is to be made of the body. Normally in time of war such a question would not be asked, for the body would be interred and the identification tag which every soldier wears around his neck would serve to identify the remains at some future time if that were desired. It is, however, the beginning of a war; there have been no large casualties and the Red Government may wish to follow the generous practice of the American Government in returning promptly to the home country the remains of soldiers killed in action in a foreign clime. Furthermore, the

command is but a short distance from the base. Motor trucks and motor ambulances are available. The decision is therefore made to send for the body that night and take it back to Campville. The decision is influenced by the fact that another report shows a cavalry soldier suffering from appendicitis and recommended for prompt operation. The same ambulance therefore which brings in the body of the dead soldier will transport from the cavalry camp the sick soldier who will be removed to one of the field hospitals at Wayville for operation. Other reports indicate that one horse in one of the field trains broke a leg and had to be destroyed, that two men were overcome by the heat and that one man broke an arm. All will be removed to the field hospital, thence turned over as soon as practicable to the evacuation hospital at Campville. We now observe a local peace officer of the Blue territory who has come to complain of an assault committed by some of the cavalry soldiers while passing through Wayville that morning. The matter was referred to the Provost Marshal to investigate. So it will be found that all the officers of the staff, each in his own department, are busy and that their duties will keep them up until a late hour of the night.

The march order for the following day was prepared and delivered or wired to the various officers concerned. It provided for the resumption of the march at 6 o'clock the following morning by the same roads taken by the division the preceding day. The cavalry was directed to hold the bridges with detachments until the arrival of the advance guard of the division and to continue the march on Junction City.

CHAPTER XVII

COMBINED ARMS IN ACTION (*Continued*)

The following morning at 6 o'clock the Division left its bivouac and resumed the march. In due course the two columns crossed the bridges held by the cavalry detachments which thereupon trotted ahead and rejoined the cavalry regiment in the advance. Shortly after crossing the bridges distant rifle firing was heard from the front. This grew louder as the head of the main body continued its advance. This was about 9 A. M. and the point of the advance guard at that time was distant from Campville 24 miles, and from Basic City but 6 miles. At that moment an officer rode back from the advance guard with a short message from the advance guard commander stating that there was continuous musketry firing more than a mile ahead of the point, and that the cavalry was evidently engaged with the enemy. The officer who brought the message answered some questions of the Commanding General about the terrain ahead, the Division meanwhile continuing

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its march. At the end of thirty minutes a cavalryman galloped up with a message addressed to the Chief of Staff; it was from the cavalry commander four and a half miles south of Junction City on the 2-4-6 road, 15 Jun. '14, 9:25 A. M. It read:

"Our patrols this morning met and drove back small patrols of the enemy's cavalry and are now engaged half a mile north of here with forces of the enemy who appear to be entrenched. I will attack at once enveloping their right flank."

After conferring with the Commanding General the Chief of Staff wheeled his horse to the side of the road, dismounted and wrote out the following message:

1st Division, Red Field Army,
2-4-6 Road, 7 miles south of Junction City,
15 Jun. '14, 10 A. M.

To Commanding Officer, 1st Cavalry.
Push the attack. You will be supported.

XYZ,
Chief of Staff.

At the same time a message was despatched to the advance guard commander to push up in support of the cavalry. These messages were given to the cavalry orderly for delivery, and a few minutes later an aide was despatched to the cav-

alry commander with oral instructions to the same effect. This was a precaution frequently adopted and based on the possibility of the orderly being unable to deliver the written message. It would also enable the Commanding General upon the return of his aide to receive from him as a trained officer a more comprehensive account of what was going on in the cavalry action than would be possible through the agency of hurriedly written messages.

By this time artillery fire was heard in front, and from the concussion and sound, it was evident that the guns were those of the enemy. The Chief of Staff now mounted, galloped ahead and rejoined the Commanding General. They determined to ride on and get a better view of the situation in front. Followed by the mounted section of the Headquarters Detachment they moved forward at a trot, and after riding about one half a mile, found the reserve of the advance guard leaving the road and moving into the fields on the right, where there was considerable cover in the form of timber. The advance guard commander was with this reserve and had just sent patrols well off to the right and left to provide for the security of the position. The field artillery battal-

ion was off the road and in a field to the left behind a rather steep ridge. The horses were hitched to the carriages and the batteries were in double section column. One of the officers explained that they were occupying what is known as a position in readiness and that their commander with some assistants was making a reconnaissance for the purpose of determining the best position for placing the guns. The engineer detachment accompanied the reserve, as did the signal detachment, while the ambulance company was for the moment in column in the road further to the rear and under cover of the woods in front. The remaining troops of the advance guard, which consisted of the support were out of sight beyond the woods. Let us accompany the advance guard commander with the reserve which is now entering the woods in line of companies, each company being in column of squads, or as it was formerly called, column of fours. As we enter the woods the sound of the firing in front grows louder and we can hear bullets striking the trees above with loud, resounding whacks. In advance of the line of companies are scouts or patrols. In a few moments a scout comes back and reports to the advance guard commander that his patrol

reached the far edge of the woods about 200 yards further on, and that from such position he could see about 500 yards beyond, a skirmish line formed by the support. He further reported that the skirmish line occupied the crest of a slight rise in the ground, but he could not see anything of the enemy owing to the fact that the position occupied by the enemy was evidently below the level of the rise. At that moment two shrapnel fired by the enemy burst in the woods, three of the men in one of the companies being struck by shrapnel balls. They were given first aid, one of them remaining on duty with his company, the other two walking back to the dressing station established by the ambulance company. At this point the Commanding General conferred with the advance guard commander, and they both went to the edge of the woods and studied as well as they could the ground in front. The result of this brief consultation was that the Division Commander directed the withdrawal of the cavalry, part of which were then fighting on foot with the infantry support, and sent them to operate against the enemy's right and rear. He sent another message to the right column to halt and await orders. He did this for the purpose of withholding them from the action

until he could determine what force was in his front. He directed the advance guard commander to push in his reserve on the firing line and to press the attack, telling him that the field artillery battalion was now relieved from its advance guard duties and would be under the direction of the Division Commander. He sent word back to the main body to continue the march. He informed the artillery brigade commander that he proposed to develop the enemy's position with the troops that had constituted the advance guard, and directed him to support their attack. At this moment artillery firing was heard from the left and shortly thereafter a field artillery officer reported to the advance guard commander that the field artillery battalion occupied a masked position about one-quarter of a mile to the left of the road, and that the battalion commander's station, from which he directed the fire, was between the road and the guns, and on a high knoll which could be seen from the road. He further stated that from that position the enemy's line could be seen about 1400 yards to the front, and that it seemed to consist of a line of skirmishers who were not very well intrenched. This officer remained with the advance guard commander for the purpose of

keeping in touch with the development of the attack, and communicating to the artillery commander, the requirements of the infantry in respect to supporting artillery fire.

In pursuance of the orders of the Division Commander the advance guard commander directed one of the battalions of the reserve to advance and deploy on the right of the firing line in front. This was done, and apparently with no loss owing to the slope of the ground in front, although occasionally shrapnel, apparently aimed at the skirmish line, came over the ridge and between the firing line and the edge of the woods which sheltered the reserves. The firing continued heavily for about fifteen minutes at which time a lieutenant reported to the advance guard commander that the line in front, while it had sustained some losses, was strong enough to push the attack, if supported, and the attack were covered by artillery fire. The Lieutenant, who was speaking for the support commander, who commanded the firing line in front, stated that the enemy's line was distant from them about 900 yards; that no more than a regiment apparently held the position, and that their intrenchments seemed to be of the hastily constructed type. The enemy's artillery appeared

to be in their right rear judging from the direction of the sound and the angle of fall of the projectiles.

The advance guard commander thereupon directed the second battalion of the reserve to advance to the support of the firing line and to send in the companies where needed. He sent the Lieutenant back with direction to the support commander to advance his line, that he would be supported and that the artillery would cover his attack. In the meanwhile the artillery brigade commander had received his orders, had visited the position of the field artillery battalion already in action, and had selected sites for the remaining artillery battalions when they should arrive. The artillery battalion already in action had obtained the firing data necessary for directing their fire on the enemy's line and were effectively covering it with fire. This fact was noted by the support commander whose men were also firing effectively at the same objective. Acting according to the principles explained under the chapter on infantry, he advanced subdivisions of the firing line to successive positions each closer to the enemy than the preceding one. Such casualties as the line sustained during the advance were replaced by

pushing forward squads from the reserves. Of the men who had been struck, some had apparently been killed or were unconscious for they were apparently lifeless. Some could be seen running back quite actively, while others were making their way to the edge of the woods with apparent difficulty. Practically all of them, however, had remained where struck until they applied and adjusted the compress and first aid bandage carried by them.

The Commanding General about this time said to the Chief of Staff: "I don't believe from the lay-out of the ground in our front, as indicated by the map, that the enemy in our front is anything more than an outpost or an advanced line. This is confirmed by the reports of the support commander from our firing line which state that the enemy's intrenchments appear to be hastily constructed. I want the cavalry to withdraw and attack the enemy's right and rear. This may compel their withdrawal if our belief is correct that the enemy is not present in force. If on the other hand they hold the line in our front in force, I may make the main attack against their left, with our right column which is now halted. It is too early to determine this now. We will go to the

hill on the left of the road where the artillery observing station is. Notify all organizations that messages for me will be delivered there. Get wires laid at once. I want to see the artillery brigade commander on the hill."

They walked back in the woods to where their horses were, mounted and rode off. As they left the Chief of Staff told the advance guard commander where to send messages. He instructed the commanding officer of the signal battalion to establish wire connection at once between the hill where headquarters would be, and the right column; also with the advance guard commander in the woods. He states that wire connection with the field artillery commander would be unnecessary as he would be with the division commander on the hill. The signal officer left at a gallop to execute this order. The Chief of Staff directed an assistant to notify all organizations, where headquarters had been established. When they reached the bottom of the hill, the general, the staff and the headquarters detachment dismounted. Near the top of the hill and under cover of some bushes were several field artillery officers with instruments and field glasses directing by telephone, the fire of the Red batteries fur-

ther to the left. The general and some of the staff crept up to their position and examined the ground in front and the enemy's line, with their glasses. Some of the headquarters detachment were detailed to hold horses, some were detailed about four hundred yards to the right and to the left, as observation patrols, some were standing with their horses under cover awaiting calls as messengers, while three, one carrying the Division Commander's flag, rode down to the road entrance, and took station so as to display the flag prominently to passing officers and messengers. This flag served to indicate that the station of the Commanding General was in the vicinity. About this time, a reel cart was driven up, and telephone communication was established with the advance guard reserve. One of the signal officers said that another reel cart was unreeling wire on its way to the right column, and they were about to connect up with it. The field artillery brigade commander reported to the Commanding General that one of his officers was with the advance guard commander, and was keeping him posted over the wire as to the requirements of the infantry concerning the field artillery fire, and that they were cooperating successfully. The cavalry on the

firing line had withdrawn, retired to where their horses were held under cover, had mounted up, and moved off out of sight of the enemy, to attack their right flank. The Commanding General was about to issue an order in writing governing the attack to be made, when the Chief of Staff informed him that the advance guard commander had just 'phoned he would assault the enemy's line in his front in a few moments. The message requested the artillery to speed up in its fire for a short interval and to watch for the appearance of his assaulting line, so as to shift the fire and not hit his men when they got in close to the enemy. Shortly before this the commanding officer of the 3rd brigade reported by an aide that his brigade, pursuant to an order from the Chief of Staff, was closing up and already had one regiment massed in rear of the woods where the advance guard reserve first deployed. The engineer battalion acting as infantry, was posted on the left of the field artillery as a support. As the artillery increased the rate of its fire at the enemy's line, another battalion of the Red artillery which was to the left of the battalion supporting the infantry attack, suddenly opened fire with great rapidity and intensity. The sound of the firing

was now such that even on the hill, the atmosphere seemed to be shredded, and it was difficult to carry on conversation, except by shouting. The Red infantry line had pressed forward to an old stone wall about three hundred yards from the enemy's line. There they were lying down, firing with great rapidity. Bayonets were being fixed without any apparent diminution of the fire. Suddenly the line rose and with a cheer started forward on a run toward the enemy. A few men were seen to stumble and fall. Some of them arose and went on. The shrapnel which had up to that time been bursting along the line of the enemy's intrenchment, throwing up clouds of dust where the shrapnel balls spat, and thick clods of earth where the projectiles burst on impact, now went screaming over the top of the ridge. The enemy could not now be seen. They had evidently withdrawn from their intrenchments, about the time when the fire attack was hottest, just before the assault began. It was evident that the Red infantry of the advance guard which made the attack, although they had not suffered a high percentage of casualties, were greatly fatigued. They were intermixed somewhat. Some of them were firing in the direction of the enemy, while

others had thrown themselves flat on the ground, apparently exhausted from physical exertion and nervous strain.

The Commanding General and Chief of Staff, and their assistants, were now busily engaged in preparing orders. These were shortly sent off. They directed the cavalry to pursue the enemy—that they would be supported. The advance of the division was directed to be continued at once by the 3rd brigade as the new advance guard, with the same auxiliary troops as had constituted part of the advance guard that morning, except that the ambulance company busily engaged in the work of evacuating the field of the wounded, was left to complete its labors, and was replaced by the 3rd Ambulance Company. The infantry of the old advance guard was directed to aid in the removal of their wounded, provide for the burial of the dead, reform their units and march as part of the main body at one mile distance. The right column was directed to resume the march maintaining communication with the main body. The auxiliary arms were assigned their appropriate places in the column, and with practically no delay, the new advance was on.

The Commanding General and Chief of Staff

looked over the position which had been held by the enemy, and discussed the events which had transpired. The assistants were writing out in formal orders the oral instructions already given for the carrying out of the movements above indicated. The following points were made clear in the course of their short conversation. That the enemy's intrenchments had been hastily constructed and were of the kneeling type. The absence of communicating trenches and of shelters for supports in rear were further indications of haste. These facts and the further fact that the enemy left the intrenchments before there was any opportunity for physical contact and in time to gain cover in the rear before the arrival of the assaulting line at the intrenchment, indicated that the enemy had not intended to make a determined stand in that position and had retired on their main defensive position—probably the ridge three miles south of Basic City, and already referred to in the estimate of the situation made by the Division Commander when he first received his orders to advance. It further appeared from the conversation between the Division Commander and his Chief of Staff that the first battalion of the Red artillery to get in action concentrated its fire

on the enemy's intrenchment with such success that the enemy's fire was relatively ineffective; that the second battalion to go into action succeeded in locating the masked position of the enemy's field artillery and it was their sudden "fire squall" which at a critical moment in the action so deluged the enemy's batteries with fire as to destroy or silence them. This resulted in the suspension of their fire against the Red infantry about the time they were preparing to deliver their assault. The first battalion therefore were performing the functions of "infantry batteries" and the second battalion the functions of "counter batteries," as explained in the chapter on Artillery.

Leaving these two officers to continue their conversation while waiting for the advance guard to gain its prescribed distance and for the head of the main body to begin its march, let us see how the intervening time is expended by the regiments which took part in the attack. The companies are being formed in rear of the crest and out of sight of the enemy's position. Rolls have been called and a check made of absentees. Where the information was readily obtainable the first sergeants classed these as killed, wounded or missing. Men who had become intermixed with other compan-

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French infantry entrenched in a strong position commanding a valley

ies during the progress of the attack were returned to their own commands. About 3000 men took part in the attack as part of the line or as supports. The casualties numbered, with the figures then obtainable, approximately 100 men, slightly over three per cent. Of these men 10 were killed or were dead at the conclusion of the action; 65 were wounded in varying degrees of seriousness, and the balance were missing. Of the missing, more than half would shortly return to their commands and account for their temporary absence. First aid stations had been established early in the action by the regimental sanitary units and at these stations some of the wounded were still receiving attention from the regimental surgeons and the regimental hospital corps soldiers, but most of the wounded had found their way back to the dressing station established by the ambulance company at a brook off the road in rear of the woods. The more seriously wounded had been carried back by litter bearers from the ambulance company and by the members of the regimental bands, while others had succeeded in getting back without assistance. As soon as the injuries of the wounded were properly dressed, when such action was necessary at the dressing station, they were

transported back to the field hospital in the ambulances of the ambulance company. One of the field hospitals in the sanitary train three miles in rear of the division had been set up pursuant to a telephone order sent by the Chief of Staff at the time the action commenced. Upon the arrival at the field hospital of the ambulances bearing the wounded, they were passed through in turn and carefully examined by the attending surgeons. Prior to such examination a list was made by a noncommissioned officer, giving the name, grade, organization and nature of injury of each soldier. Other records showed the treatment given and the disposition made of the patients. These records later become valuable data in connection with possible pension claims. The field hospital endeavors to preserve its mobility by evacuating as promptly as possible all cases by sending them to the evacuation or to the base hospital.

Returning to the field of the action we find trenches being dug for the burial of the dead. The work for the most part is being performed by the bandsmen of the two regiments engaged. The bodies of the dead are carried over to the trench and carefully examined by regimental surgeons to insure that life is extinct. The Chaplains are oc-

cupied in taking from the clothing of the dead all personal articles and placing them in sealed envelopes indorsed with the name, grade and organization of the deceased soldier. The identification tags worn around the neck are left on the bodies for purposes of future identification. After this is done the remains are interred, and if there is time the graves are marked with crosses or stones and a funeral service read by one of the Chaplains. While this is going on, details from the regiments are carefully searching the ground over which the regiment advanced to insure that no wounded or dead have escaped attention. The regimental adjutants are engaged in making notes of the hour, place and details of the operations up to that time for later entry into the war diary which is a record kept by each organization of the daily events of the campaign. A duplicate of the day's entry is sent by each organization to the next higher commander, and from these the latter makes his daily report. He in turn forwards a copy of this report to the next higher commander sending the original at the first opportunity to the home war office. In this manner a careful record is made of the operations of armies in campaign, not only for historical record, but for future military study.

About this time the head of the main body, consisting of the 1st Infantry, began its march and shortly thereafter more firing was heard in the front. The Commanding General and his assistants moved off to the head of the main body, continuing to discuss the events which had transpired up to that time, and their connection with the further operations of the division during the balance of the day. It was agreed by them that the enemy had shown poor judgment in making the fight which had just been concluded. It appeared that the enemy suffered a loss of 16 killed, and of their wounded 20 had been left by them in the trenches. The remainder they had succeeded in taking with them. The cavalry which was directed to operate against the enemy's right and rear reported that in their attempt to envelop the enemy's right flank they had met some infantry reserves and had not been able to make headway against their rifle and machine gun fire. That the terrain through which the enemy retired was not well adapted for cavalry operations, and in consequence they found it necessary to confine their movements largely to the roads, which facilitate the safe withdrawal of the enemy. Cavalry patrols had found the position occupied by the enemy's artillery and had

counted 27 dead bodies of Blue artillerymen and the carcasses of more than 30 dead horses. On the ground where the enemy's batteries had stood there were two wrecked guns and three demolished caisson bodies, while the ground itself was considerably torn up, indicating that the fire of the Red "counter batteries" had been extremely effective. The retiring Blue batteries had, however, carried off their wounded.

Shortly thereafter a message was received from the new advance guard commander stating that his support was driving in the enemy's patrols, and that the enemy appeared to be strongly intrenched along the ridge referred to by the Commanding General in his estimate of the situation. The enemy's right flank was protected by an extensive swamp and the left flank by an unfordable stream. The Commanding General directed the advance guard commander to continue his development of the enemy's position. He rode forward to join the reserve of the advance guard.

The Commanding General knew that he was face to face with a problem involving a frontal attack against the enemy's position, if his advance was to be made aggressively and promptly as his mission required. He had no information as to what re-

serves and other forces constituted the strength of the enemy in his front. With the Signal Battalion there had been attached two portable aeroplanes, and these he directed the Chief Signal Officer to have prepared for immediate reconnaissance of the enemy's position. The necessary order was telephoned back to the trains with which the aviation detachment with three motor cars, was moving. This order was formal in its nature and prescribed the mission of the aviators and the observers who were to accompany them.

The action developed very much the same as the preceding action had developed, except that the fire of the enemy was more intense and accurate, his line better screened, and altogether the position showed indications of careful selection and strength. The Red artillery brigade commander made a careful reconnaissance for positions for all the artillery battalions. One regiment was placed in a masked position to the rear and toward the left of the Red line, while the other regiment occupied a similar position with respect to the right of the Red line. Although the artillery regiments were thus separated by intervening ground they were not in fact separated in the tactical sense, for the reason that both regiments were connected by

wire with the brigade commander who occupied a crow's nest hastily constructed for him and his assistants near the top of two tall pine trees which stood close together and which were screened by other trees in front. From this position he had an excellent view of the enemy's position and direct control of the two regiments of field artillery. He could shift their fire, concentrate or distribute it as he might dictate, and in accordance with the system explained in the chapter on Artillery. The cavalry was withdrawn, one squadron acting as a flank guard for the right flank of the line, a second squadron performing a similar function for the left flank, while the remaining squadron was held with the general reserve. The advance guard of the right column deployed and went into action, but the attack was not pushed for the moment. By the time these dispositions had been concluded, the Red aeroplanes had made their ascent, gained an altitude of about 4000 feet, about three miles to the left of the Red line, and were now approaching the enemy's position from the flank. The men had been so actively engaged in the performance of their own duties that there was much doubt as to whether the aeroplanes were hostile or friendly. About the time of their ap-

pearance, however, the commanding officers of organizations informed their units that the aeroplanes were Red machines. It was remarked by a signal officer that similar doubt would arise in the minds of some at least of the enemy and would favor the operations of the aviators and observers. Shortly thereafter the aeroplanes having traversed the air above Basic City, flew over the enemy's position at a lower altitude and then rising higher passed off to the right and disappeared. Ten minutes later their reports were being received over the telephone. These reports were to the effect that there was much activity in the railroad yards at Basic City, that long trains of cars were present on sidings, and that switch engines were moving back and forth; that flat cars and box cars were being loaded; that several hundred men were working about the freight houses and stations; that more than one hundred wagons and teams were gathered there; that no troops in considerable bodies seemed to be on the roads; that about 1500 yards in rear of the enemy's position and opposite its center were two regiments of infantry apparently performing the functions of a general reserve; that the enemy's field artillery apparently consisted of a battalion and occupied a

position on the extreme left of their line and close to the front; that from the position of the observers above them the position did not seem to be a masked one; that the enemy's line seemed to be well intrenched, with communicating trenches connecting the shelters in the rear; that the number of men estimated to be on the line and in support in the shelters was not more than a brigade; that no cavalry was seen except small detachments which together did not exceed a squadron. Upon receiving this report the Division Commander determined to attack after thorough preparation by artillery fire. He accordingly issued an attack order, in the usual prescribed form of five paragraphs.

Upon receipt of this order the organizations knew the nature of the work cut out for them. As a matter of fact the enemy's artillery could not be seen, either from the ground or from the position of the artillery commander in the tree tops. But knowing from the report just received the location of the enemy's artillery he was enabled by careful observation through powerful glasses to detect slight puffs of dust thrown up from in front of the enemy's guns when they were fired. He therefore caused one platoon of one of the bat-

talions of artillery to adjust its fire on the enemy's guns while the regiment on the left fired at the enemy's intrenchments. Having completed the adjustment of fire and obtained his firing data he made the necessary calculations to furnish the correct data for all the guns to bring their fire to bear upon the Blue artillery. He asked permission of the Division Commander to turn loose on the Blue artillery the fire of every one of the Red batteries in order that he might overwhelm and annihilate the same without loss of time and then promptly turn the attention of practically all the batteries to the Blue infantry. This consent was given and in a few moments, pursuant to the necessary orders, the entire Red artillery brigade fired for effect against the Blue battalion. The command was for volley fire, three rounds, which means that every gun in the brigade, 48 in number fired three shrapnel against the Blue battalion. This caused a total of 144 projectiles to burst in and about the batteries within one minute after the command to fire was given. Some of these projectiles, fired from the regiment on the right, struck the Blue artillery from the front, while those from the regiment on the left fell at an angle almost enfilading the Blue artillery.

Most of the shrapnel burst in the air, spraying the entire position with shrapnel balls, while others burst on impact, overturning and shattering some of the carriages. Some of the projectiles went to the right and left in front of and behind the line of Blue guns and some of these fell among the drivers and horses of the Blue batteries which were in a slight draw to the left and rear of their batteries. The Blue artillery was so thoroughly cut up and demoralized that their fire promptly ceased. The Red artillery brigade commander thereupon ordered that the battery on the extreme left of the Red line should continue to fire against the Blue artillery position, to further the enemy's demoralization and to insure the continued cessation of their fire. This permitted 11 batteries of artillery to concentrate their fire against the Blue line. The Blue line was divided into sectors and each battery was assigned a sector. It was soon evident that the effect of this fire was such that the enemy's infantry were badly handicapped in their efforts to stay by infantry fire alone the advance of the Red attack. The Red infantry attack had succeeded in advancing to within approximately 700 yards of the enemy's position and were protected here and there by boulders,

the bed of a dry stream and by clumps of trees.

The Division Commander at this time determined that he would make the main attack against the right wing of the enemy's line, and the Red artillery brigade commander was instructed to prepare the attack accordingly. If the latter officer suspended fire against other parts of the enemy's line it would be notice to the enemy that the attack would probably fall elsewhere, and so he directed the left wing of the Blue line to be covered by the fire of one battalion while the remaining battalions concentrated their fire against the right wing.

While this was being done the Division Commander who had been connected by wire with his subdivision commanders directed that the supports and reserves be closed up well within supporting distance of the left half of the attacking line, and he also designated a particular sector of the enemy's right wing which was to be assaulted at the earliest moment, consistent with proper preparation. He asked for a report from the commander of the firing line as to when he felt he could attack with success. This report was shortly thereafter received from the brigade com-

mander in charge of the line and was to the effect that he would assault in about ten minutes. Thereupon the field artillery was directed to increase its rate of fire, and about the time predicted the infantry line having advanced under the protection of that fire to a line about 250 yards from the enemy's position suddenly swept forward with a cheer. Shortly after their charge began the artillery fire was raised and swept the ground in rear of the enemy's position. The Red infantry gained the enemy's position and thereupon began firing rapidly toward their right. They were firing into detachments of Blue troops who had been tardy in leaving their intrenchments on the left wing of the enemy's line. About this time the right of the Red line swept forward and gained the Blue intrenchments in their front. Many Blue prisoners were captured particularly among the organizations that had held the left of the line of their brigade.

What followed thereafter in respect to the operations of the sanitary troops, the advance of the reserves, the quick forward movement of the cavalry to cut off the retreat of the retiring Blue infantry, resembled generally the operations of the morning which have already been described.

The foregoing gives an outline of the manner in which an action is conducted where the auxiliary arms of the service are present and coordinating their efforts with those of the infantry for the accomplishment of success. There are many variations of the form in which contact with the enemy is made and subsequent combat conducted. Each situation demands its own methods of tactics and of leadership, but the foregoing will suffice to indicate the wide diversity of technical knowledge necessary for proper coordination in the field and the necessity for thorough advance preparation in time of peace to make the expectancy of success reasonable, in time of war.

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